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Species Accounts:-

- { Mammals
- { Reptiles

Censuses

Weather records

1930 - 1936

E L Sumner, Jr.

Canis ailuropus

2/16/30.

Manysville Butte, Sutter Co. Calif. below
West Butte. Tracks numerous along
muddy stream bank on youth exposure.

Numerous skeletons hung on fence
by trappers on road from West Butte
to Sutter, opposite West Butte and
North Butte. Several skulls collected:

Benson 883

" 84

" 85

" 86

(memo)

See man by name of Lamme for infor-
mation regarding trapping etc. He lives
in this region; inquire at Post Office

3/19/30

Beckwith Ranch, 10 mi E. Escondido, S. Diego Co.,
Calif. Tracks crossing corner of wet ploughed
field; very large.

{ Same day }

Quejito Ranch, San Diego Co. Tracks of coyote
noted in mud and wet sand in vicinity
of two water courses at S. E. end of Ranch.

5/28/30.

A few tracks noted along edges of sloughs at
Los Banos Game Refuge, Merced Co.

5/29/30

Large hole with many tracks just to east of
Upper Mud Slough - seemed to be den of this species.

Cariacus aculeatus 2

6/17/30. ^{C.} Frank Clark's Ranch, Laytonville.

Data on coyotes, fencing problems etc given me by Frank Clark:

①. Fence - pickets sunk in ground 1 ft.
3 strands of barbed wire at top.
total length of pickets 6 ft.
total length of posts (supporting
barbed wire) $7\frac{1}{2}$ ft.
material red wood.

②. Poisoning coyotes:

(a) use 1" cubes tallow or suet.

(b) scatter these unloaded somewhere
off from main trail to cow,
house, or other bait, as for
instance on top of a low rock.

(c). after several days of unloaded cubes
use loaded bait. This placing
off from main trail will tend
to get coyotes to exclusion of other
fur bearers.

③. Clark says poisoning (i.e. any elimination
of coyotes) may be beneficial to
the total population of fur bearers
in the long run, because although
some of the fur bearers may be
sacrificed the remainder will
be freed from competition with

Canis latrans 3

the coyotes, as well as the excess number of their own kind. For instance, coyotes prey on skunks, and Clark maintains that since the B.S. has thin red cut coyotes on his ranch skunks have become twice as numerous.

(4). Role of disease in keeping down rodents.

(a). One squirrel, introduced by man here, multiplied out of all proportion, but were killed off by a disease resembling orange and all but disappeared. (1924) (several others also, earlier, 1893 for one)

(b). Pocket gophers suffered similar fluctuation in the 90's and haven't been here since! They were very abundant.

(c). { Field mice were very abundant; disappeared in similar fashion (about 1918 was the peak of abundance for one time).
Microtus

(5). Predatory animals as controls.

(a) Value very small in case of Coyotes because so greatly over balanced by damage done to sheep.

(b). Skunks very few here

(c). Ground squirrels not checked at all by coyotes even during periods of greatest coyote abundance, on this range.

Canis albus 4

7/8/30

Los Banos Game Refuge, Merced Co. Calif.
1/4 grown pup caught about 2 weeks previously
by Mc Lellan and kept tied up by the house;
it had been brought to bay by the dog, while
with its mother; the old one escaped.

7/12/30

L.B.G. Refuge. 5 A.M. Awakened by yelping of
a coyote to find a 3/4 grown animal standing
250 yds from the sleeping quarters and barking
excitedly. This it kept up pretty constantly for
about 10 minutes, occasionally stopping long
enough to trot from one knoll to another
but keeping in the same general spot, and
facing the shack. When it yelped it seemed
to utter its cries with some force, for at
each yelp its head was brought down as
though forcing out the sound. How long
it might have kept this up (the 1/4
grown pup mentioned above seemed to be
the attraction) I don't know, for after
about 10 minutes J.S. Hunter fired a
shot at it where upon it ran away. At
his second shot it seemed to become
really scared and fled belly to earth, so
fast that the dog (all the while an
expectant onlooker) which started to chase
it was quickly left far behind. This
animal was surprisingly bold, for in

Canis latrans 5

order to get the rifle both Hunter and McTellan had to leave the sleeping shack by the front door, directly opposite the coyotes, and move to the old sleeping shack in the rear. During this time the coyote merely layed ~~was~~ 75 ft further off and then sat down and went to barking again.

(A)
7/10/30

Apparent coyote den (tracks alone, scattered squirrel and rabbit bones, fresh diggings) located on west side L.B.G. Refuge. On being visited next day even more fresh dirt noted.

7/16/30.

A dead coyote $\frac{3}{4}$ grown, apparently shot, and dead about 2 days, discovered on west side L.B.G. Refuge near Halls.

Later: Two coyotes seen by McTellan & Son, near Salmon Creek, L.B.G. Refuge in afternoon; 1 young one and one older one.

7/22/30

Three coyotes seen near central section of Los Banos Game Refuge by H. McTellan and R. Watterbarger in forenoon.

7/23/30.

L.B.G. Refuge - $\frac{1}{2}$ mile east Mud Slough and $\frac{1}{3}$ mi S. west arm Olson Pond. 1 individual scared from margin of small marshy slough. Disappeared S.E. toward Miller and Lux land.

7/

1 ~~to~~ $\frac{1}{3}$ grown individual shot near "high point" by H. McTellan and R. Watterbarger.

Canis adustus b

7/20/30. L.B.G. Refuge. 3 seen just across north line in A.M. by one of Kaufmann's men.

7/31/30. Near "High Point", L.B.G. R. One adult trotting n.e. when I slowed the car down it broke into a gallop and disappeared.

7:30 P.M. One seen trotting along n. side of Button Willow Pond, at sunset.

8/1/30 One heard barking at 6 A.M., in bright sunlight, south of L.B.G. R.

7 A.M. cor. n.e. of Button Willow. 1 seen. He trotted away until about $\frac{1}{2}$ mile distance, then began walking about slowly, staring at ground squirrels sitting on nearby knolls, etc. quite at his ease.

9/9/30. 20 mi. S. Las Banas on road to Sweeney Ranch, More. Co. 7:45 (about) P.M. full moon. Coyote directly in front of headlights, on road, at about 35 ft. Moved off 100 ft. to one side and watched us. There was a jack rabbit also on the road, just before we saw the coyote; perhaps he was after it.

9/18/30. Las Banas Game Refuge - interview with McTellan. Says coyotes have been abundant along N.E. corner section of Refuge. While working at this point he

Canis velox 7

saw coyotes practically everyday. At one time he saw seven together, another time two, another time 3. Today he saw a coyote running off with a cotton tail in its mouth; although shot at three times, with the bullets coming very close, the coyote did not drop the rabbit. Mc Lellan says Jackrabbits are scarce now over most of refuge and coyotes are living on rabbits and waterfowl. Says coyote diggings over in S.E. cor. by big new ditches.

9/19/30 L.B.G. Ref. n.e. cor. between B. & Wilcox Pond and cor. of fence. One coyote seen at dist. of $\frac{1}{5}$ mi. running swiftly toward Pelihle Beach. in "terra incognita". Many gr. squirrels seen sitting up very straight in attitude of watchfulness in that vicinity; some of these were watching me — these were mostly between 150 and 300 yds ^{away} though.

9/20/30 L.B.G. Ref. 8: A.M. near entrance of Salmon Slough to Refuge. I seen at $\frac{1}{4}$ mile galloping off. When I stopped the car it stopped too and stared at me then turned around and retraced its steps slowly about 15 ft., sniffing as it did so — then it turned again and galloped on in its original direction. This it did twice and then disappeared from view.

Canis ochropus 8

- 10/4/30 L.B.G. Ref. None seen by me on this trip but McAllan reports 3 seen together a few days ago and one heard 2 mornings ago.
- 11/12/30 L.B.G.-R. McAllan says that coyotes are as thick as ever and that they, together with the marsh hawks, are eating all the crippled and wing-tipped ducks on the refuge. Says he can tell coyote tails from marsh hawk tails because coyotes don't leave the bones. They do appear to leave the last joint of wing, with pin feathers attached, though.
- 11/27/30 L.B.G.-R. south of Allison Pond and due east of Holt's water tower. Full grown individual; made off in direction of River, toward n.e. cor. of Refuge.
- 1/31/31 L.B.D. Refuge. north of pond. 7:15 P.M. (cloudy dark night) one heard to howl once - not prolonged; just a couple of short howls.
- 2/4/31 By 3-legged tower, L.B.G. Refuge. Last night two coyotes heard howling for a considerable time.
- 3/6/31 L.B.D. Ref. n.e. of 3l. tower 1/2 mi or more, about 10:30 P.M. What seemed like two, yelping in chorus. They yelped for several minutes but at

Cairns ochropus ?

no time gave their usual long drawn
howl.

3/8/31 About 5:30 A.M. (Sun just appearing).
Same place. Two heard again for
2 or 3 minutes, this time giving the
howl as well.

3/9/31 Near Olson Pond, L.B.D. Ref. About 7 A.M.
One seen by Miss Ericson moving n.e.

3/16/31 One heard in vicinity of Button willows
before dawn.

4/20/31 Mc Lellan says he saw a large one
going north on the west side of Mud
Slough south of H. Rutt Lake, it ran
away when he sicked his dog on it. He
told me of seeing another in about
that same section about 10 days ago. But
I forgot to put it down at the time;
he thinks the extensive flooding on the
east side of Mud Slough — their old
haunt — has diverted them over to
the other side (I don't know; there is
just as much, or more, impediment
on the west side and much less
game and more civilization).

4/20/31 L.B.D.R. and Bates camp. Heard one during
the night once; seemed to come from
vicinity of Hobb.

5/5/31 L.B.D. Refuge by 2nd Butte camp
one heard during the night.

5/8/31 L.B.D.R. S. of Olson Pond. Discovered
one when I was only about 80 yds
from him. He was looking slowly
off at the time. I stopped instantly
he stopped too, and at the same
instant a jack got up in front of
me and ran off diagonally past
the coyote. There was a moment of
indignation for the coyote. He
looked at the jack and then
at me, evidently, but then

ran a few steps then stop and look
first in the direction of the jack
and then at me, then run 30, 40, or
75 ft more. This happened fully
ten times, by which time he was
many hundred feet away. Finally
he bolted away off without any
more looking behind and when
1/3 of a mile south lay down in
a patch of grindelia (gummy composite)
weeds. Here he lay for half an hour
while I watched him. He would
move his head about continually,

Canis aethiops //

looking from point to point on the horizon but mostly at me, however, he seemed perfectly at ease and likely to stay there until dark so that after more than a half hour of it I left.

5/21/31

L.B.D.R. Mud Slough E. of Puck Lake, one individual seen loping eastward from the slough as we approached. Turned around to watch us after every few hundred feet in characteristic manner. Was seen shaking head ^{vigorously} like a dog once.

6/1/31

S.F. Office, 510 Puss Building. A.D. McEllen said Roy Wattenbarger had found a coyote den at the s.e. corner of the refuge where the big ditch came in. Talking to Roy at the L.B.D.R. later he said the den is concealed by tall grass and is located just a few feet from the big ditch in the triangular place formed there by the ditch and the corner of the

den. He said that when he got there ^{5/23/31} he jumped two young coyotes that were outside and that while one went into the den the other, which

Canis veloxus

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was some distance away was hauled
by the dog "Pick" and I was held at
bay by the latter until Ray came up
and picked him up. This pup was
very small and had to be fed milk.
He was given to some people in town to
keep. Ray says there is another coyote
den across the fence on Peck's Beach
property about $\frac{1}{4}$ mile from the
first, also with pups.

6/2/31

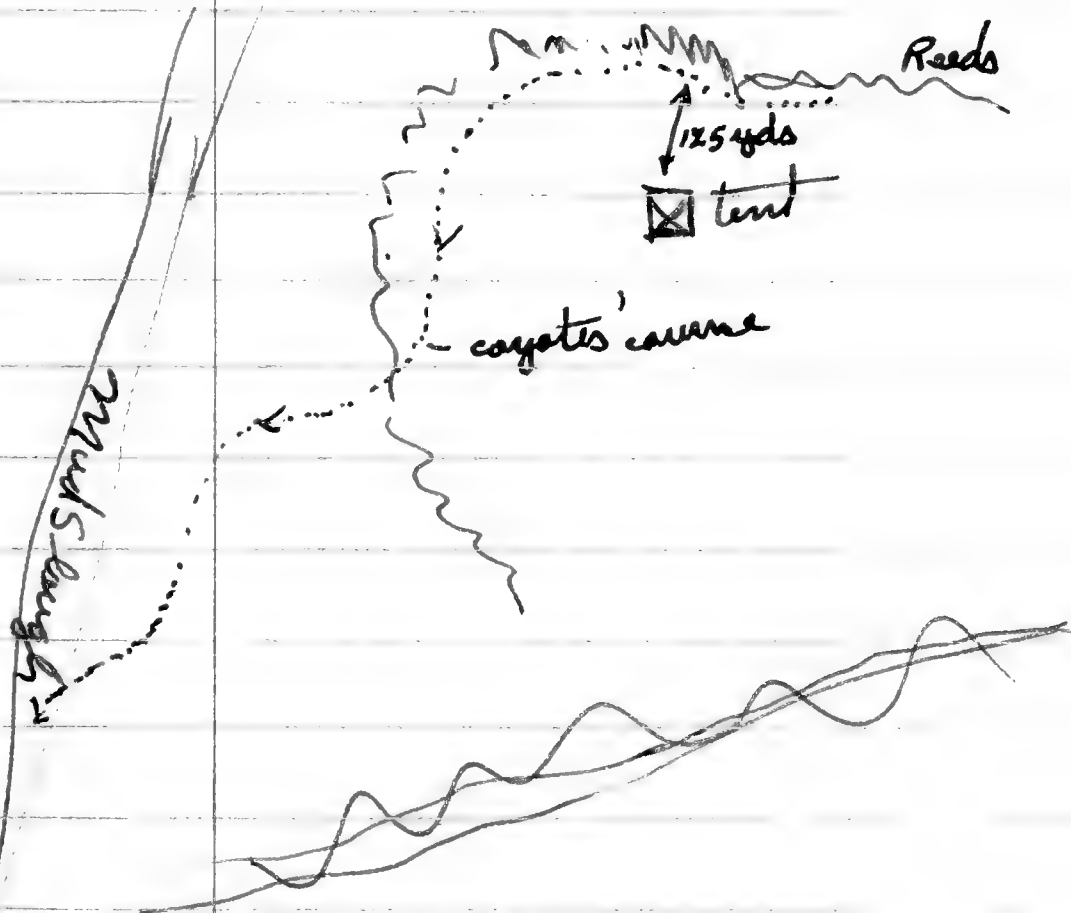
This A.M. (8:40 a.m.). I saw three
coyotes walking along, one more or
less behind the other, 125 yds from
the camp. I was inside the tent and
I think they did not see me, although
one when the box on which I
sat creaked one of them jumped and
ran twenty feet or so. They moved
along sometimes one right behind
another sometimes straggled out
over 100 yds, when one would
lag behind to sniff or stand still
and observe the terrain surrounding.
One was in the lead, nearly all
the time and the other two trailed
along on his course but they were
all full sized coyotes and fairly mixed.

Canis ochropus

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others standing nearly side by side. They caught nothing while I watched, but moved in a wide circle following the fringe of the marsh until they finally disappeared over by Mud Slough behind its near bank.

N



The men were working with the tractor $\frac{1}{2}$ mi away, on the other side of Mud Slough, but the coyotes although seen to look in their direction at times, did not hesitate to cross wide open places in their course from the marshes to the Slough, or even by the marshes themselves. Ground squirrels were all about, and

were heard to give the alarm note whenever a coyote came within about 75 ft but nevertheless they did not actually retreat under ground, merely sitting bolt upright by their holes watching the movements of the coyotes. I could even tell where the coyotes were by observing ^{intuitively} ~~where~~ the squirrels were facing. See under *Thomomys* 6 for possible destruction of nest by coyote; however it is not certain that this is not a dog track; also the drying up and recession of the water may be responsible for the birds' failure, not the a coyote.

6/6/31

Coyote watching - In my car (shades down) parked against big dunes on Pebble Beach land just e. of s.e. cor Refuge, watching den mentioned on p. 11

3:35 (ab). 1st arrival - moonlight; not the faintest trace of dawn

4:10 Lightening of the horizon announcing the approach of dawn.

4:36 heard a coyote howl, faintly, in the distance

4:55 Sun nearly, or just, up. Heard a prolonged howl and made out a (♀? slight

build) coyote standing ab. 200ft from the den in plain view, howling at intervals. When a coyote howls it raises its nose more than perpendicular so as to give its head at this moment a contorted unnatural look as though someone had pushed it violently back as far as it would possibly go



also I notice that they stand, looking about, with their tails between their legs giving them a "guilty" look even when presumably at ease (this coyote wasn't even looking in my direction during the performance). Presently it stopped (because it was standing all the time, unlike the picture ^{above}) looked all around, even at the car, and then began to make its way at a trot towards me. As it passed a particular section it was mobbed vigorously by a pair of humming birds which rose and swooped and rose and swooped all the time uttering a little ^{high-}pitched scolding note which they make commonly. The coyote

seemingly paid no attention and shortly leaving their territory, was harassed no more. He ^(I mean the) continued to approach at a trot - looking tremendously long legged, long necked, and slim; also his ears were laid mostly back



(looks like an
out lion?)
but illustrates
the case.

A jack, half crouching on a ridge, laid back his ears nervously and when the coyote for a moment dipped down out of sight in a little depression, it ran off at a pretty fast gallop and did not stop as long as I was able to see him (200 yds or so); a cottontail near the jack continued feeding until the coyote was within about 200 ft., and then nearly ran along a ridge and stopped (I suppose he had a hole there somewhere). The coyote's course led him up to and past me at a distance of about 125 ft and as he began to come opposite he stared more and more at the car until he was looking at nothing else. This new object certainly aroused his curiosity or suspicions but did not scare him to the point of turning out of his course. After

passing me, and continually looking back, she (?) ran up the steep ditch bank 100 yds behind me, looked over the top at the country beyond (beautiful silhouette she made), and then turned back down again and passed out of sight around a bend in the ditch.

6:12 P.M. Have watched 13 1/2 hrs and not seen any more coyotes, or anything remotely pertaining thereto. I suspect the old ones of removing the remaining cubs after discovery of the den.

Examined the den from which Ray took the pup. It was well concealed, being in a little grassy - low - knoll ^{on a high spot of ground} near the 4 ft bank of the big ditch, which, curving, surrounded it on two sides of a triangle (at 7 ft distance) while the fence and some rough country intersected with marshes made the third side

yes, this did, or else the young left voluntarily; see below.



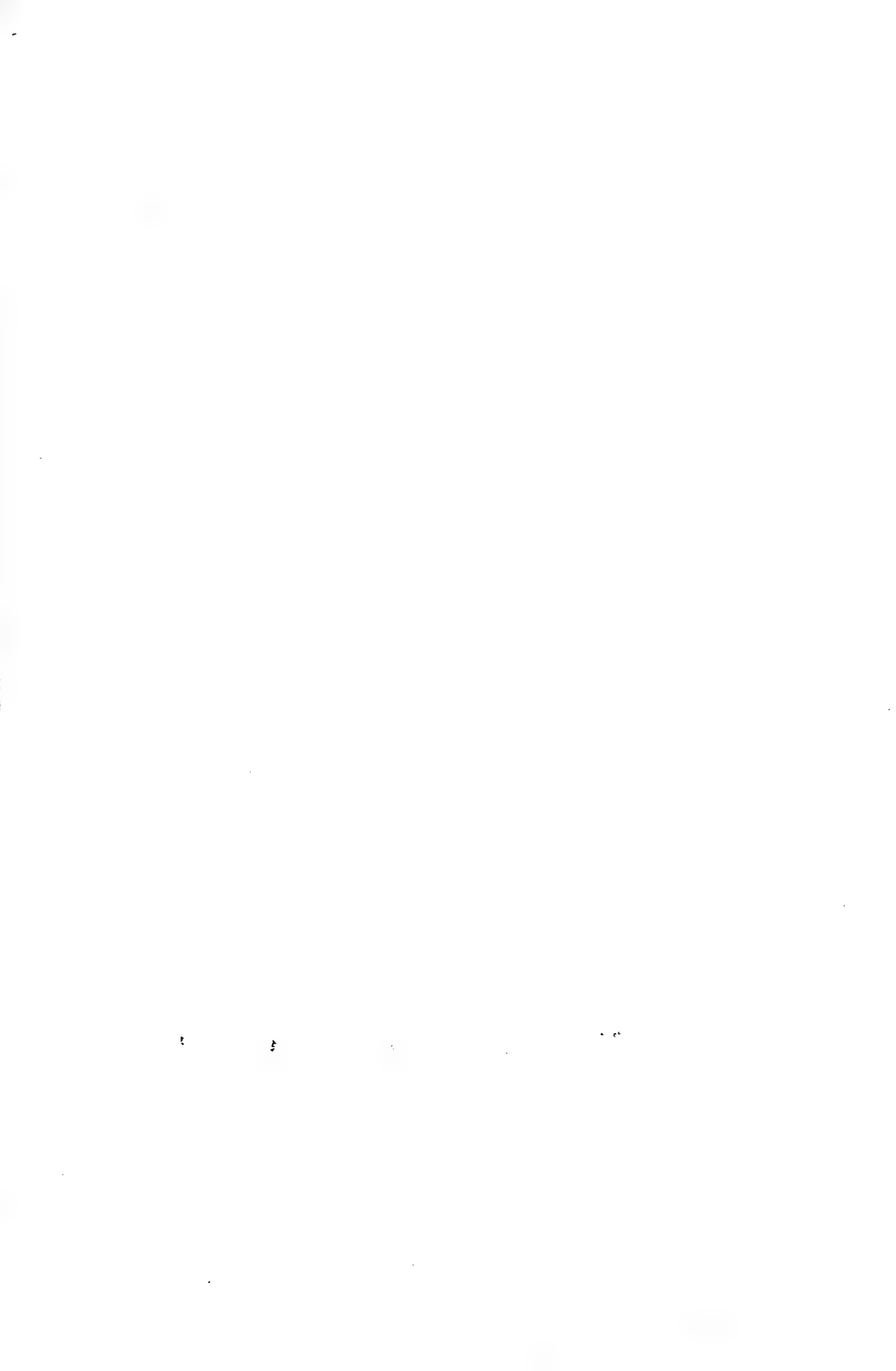
The entrances - there were ^{more} two of them, but one seemed much ~~deeper~~ ^{more} than the other - were well screened with long salt grass (?) which even hung down into the entrance as well as rising above it. The burrows seemed to have been enlarged from an original squirrel colonial system, being situated on just such a knoll as they use, and with other small (i.e. unenlarged) holes about the knoll. This second entrance was only about 8 feet from the first - if it was supposed to be a "back door" or escape entrance it showed the modification of original remotely-located back entrance plan imposed by limitations of the burrow system of the squirrel colony. The whole den was so well concealed that no one walking right up to it - unless he saw the coyote tracks at on the mound of earth at the main entrance



would ever suspect it of being anything more than just another large squirrel hole.

Conningbad at 6:15 I scoured up a

P.M.



1/4-1/3

half grown coyote from the muddy margin of a small slough. There was not much there for him to eat, seemingly, unless the eggs of the one or two pairs of stilts that were there - I doubt if he was looking for duck eggs. He was less wary than the adults waiting until I was within 100 yds before leaving even though he was out on the open mud.

Just see later observations. There are no duck eggs there!

6/8/31 9:15 A.M. Same pup - or his bro. or sister - seen in same place. He ran up a small hill just on s. boundary, and disappeared over the other side out of sight. I strongly suspect that this is brother or sister of the one taken by Ray - it is only about 1/4 grown, I see now. This confirms, if true, my suspicion that they were moved from the other den. It seems to be this coyote's habit to play around by this slough. Two photos of den taken.

Repassing 15 minutes later I saw two of them there - probably the one seen before plus one other.

6/11/31

Coyote stalks at "coyote pond" (i.e. place where pups seen mentioned above. 3:50 P.M.; fair weather; light enough to see

Canis ochropus

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to drive on road; no coyotes heard or seen.

4:45 nothing doing yet; sun will be just coming up over the Sierras in about 15 min.

4:55 Sun is now just tinging the ground, weeds, and water with an orange glow.

5:15 Bright early morning sunlight. Suddenly at the far end of the pond I saw one of the little miter-albinoed ears and quillward legs, and hardly bigger than a jack rabbit - scampering away from the dense thickets of young willows which borders one side of the pond, out across the mud flat toward the grassy bank at the far rim of the little bowl which holds the pond. He would stop every minute and look over his shoulder, suspiciously, at the car, and then gallop on, clearly showing his distrust even at this age. Presently he went up over the bank, looked back some more, and then went down the other side and was lost to view. The country where he had disappeared was nearly all exposed,

being flat and only sparsely covered with vegetation except along the ditches and occasional moist places; however, I saw him no more at this time. Just as I was still straining my eyes trying to catch him again I saw the second youngster following in his tracks, about 15 ft behind, but less cautiously, and with more frequent stops to look back at the suspicious additions to the landscape (I was down wind). This second youngster, less sophisticated but still pretty cautious, stopped on the top of the bank 200 yds. distance, in full view (guns must be an x quantity for him!) then went down the other side man along behind it several yards, and popped up again, his head with great overgrown ears standing out conspicuously through the fringe of grass. I think he wanted to turn back now instead of following his brother (?) and stay in the bushes where they have been playing and hiding since I first made their acquaintance (prev. days notes). At any rate he kept retracing his path and

sticking his head up carefully at vantage points all along the bank. One or twice he sat down right on top of it, in the middle of the road that runs there. No alarm coming from the car, he gradually worked back, coming out at different places from the long grass to look again, at last he rolled out into the open, back across the mud flat and into the willows, then through them and up onto the grassy rise of ground back of them where he began exploring, more at his ease. I could only see him at intervals but he seemed to be about aimlessly here and there, cocking an ear at this or that sound near him or stopping to sniff the grass or watch an insect (grasshopper?) jump away - all the old story of being out, young ears eyes and noses on the many new things which for young animals are everywhere. He would still stare at me at frequent intervals but the other ^{activities} were more interesting.

5:45 He (?) suddenly appeared

again from among the willows
down by the pond shore, and now
the other youngster (?) is with him,
although I didn't see him sneak back -
he is more wary. Just for a moment
this other youngster was in view, but
no longer for he looked at me and
then retreated into the willows; the
less cautious one looked in at him
and gave a little spring into the air,
stiff-legged - just the kind of caper
a butter makes before sticking its tail
up into the air and racing after its
bro. or sis - for all again with
tongue hanging out. Looked at me
again, thought better of it, and
sneaked into the bushes after his
brother. He is more wary bro. will
probably live longer than he.

7:15 the wary one came out, followed
by the other - it looked as though they had
been romping and had gotten out into
the open before they knew it; both retreated
again. The wary one is slightly
larger than the other and is definitely
the leader, the other following. A moment
after this I made out both of them

Cariacus vachellii

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galloping off through the tall grass at the far end of the pond, over the bank as before, and away over the flats, the "wayones" ahead as usual. Every once in a while he would stop and look - still at me - and the other one, slower, would come racing up and then following his bro's example, stand suddenly stiff-legged and wait too, only to bound along after the other as soon as he was ready to lead again. Mostly they kept out of sight down in the ditches, only coming up to look, and I soon lost them.

2:50^{p.m.} They must have come back without my being able to see them (there is much too much long grass everywhere) for just now one ~~other~~ started out from near the cellars, crossed the mud flats and started out onto the weed flats just as this morning. He seemed to change his plans however after he got out there (or moving ^{upon} ~~over~~ aimless impulse; he probably had no plans) for after looking

at the car some more. He turned around, trotted back the way he had come, and went into the tall *Sagittaria*-willow path; here he stayed some more, just his head showing faintly among the close-graining stems of *Sagittaria*, then disappeared for good.

4:10 Twelve hours observation and no more sign of a coyote. I leave the car and approach the willow shore of the pond openly. At the willow path (not more than 75 ft. long x 8 in. wide) I got in among the willows a little - the highest was only as high as me and most of them shorter. Before I was quite in I suddenly caught sight of one of the pups not fifty feet away, nosing about the grass just behind the willow fringe so that he could not be seen from the car; he was exploring quite unconscious of me. I flattened and crawled into the willows; he approached - but he must have heard or seen me or both, for I did not see him

Canis aethiops

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again although I looked everywhere. The soft dirt, and mud nears the shore, was everywhere marked with coyote tracks and there were many scratchings, mostly short gouges made by whole paws, but here and there a long clawmark (7" or more), and all these seemed to be made by the adult (s?). The tracks of the young were noticeably smaller than those of the adults but were very large nevertheless. At many places tracks of pups old and young coyotes led to the water and turned back again skimming where they had drunk. Scattered about among the willows were pieces of jack rabbit fur.

8/28/31

Alpine Creek (Ralph) Ranch, San Mateo Co., Calif. Moon light night. Down by "boat house". Coyotes howled at length and on many occasions, about 1/4 mile from where I was sleeping. It sounded like two individuals one time. The ranch dogs answered in chorus. B. McEllan says that a litter of pups was raised in that vicinity this year. He says, also, that coyotes are

- plentiful in the region.
- 9/2/31 Alpine Creek Ranch - I slept by the water tanks back of the orchard and heard them, off and on, again, seemingly down the hill from me.
- 9/10/31 Alp. Cr. R. by bathhouse at lake. Coyote heard uphill a half mile or so from here at about 5 A.M. when it was quite light, although not yet sun-light.
- 10/1/31 A. C. R. by old cow barn. Heard one about 3 A.M. (?) for a short time (full moonlight).
- 10/24/31 A. C. R. Las Trancas Canyon. Nearly full moon. One heard at 8:45 for half an hour or so, inter instantaneously. For 15 minutes or more, at one time, it kept up a noise resembling that of the Loons at Indian point Lake - just about the same interval between calls as the loons too.
- 10/31/31 A. C. R. One heard for a short time after dark. ^{in Las Trancas Canyon} Mc Lellan says that seven young were raised this spring on the Alp. Cr. Ranch over in that vicinity. He tried to run them down and shoot them, but they were too old for him to manage it.

Canis ochropus

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Dec 16, 1931

12/16/31 Alp. Cr. Ranch; by the bunkhouse. Last night I heard a coyote several times from about 8:30 - 9:30.

Jan 4, 1932

Alp. Cr. R. About two coyotes heard barking and howling ^{on the opposite side} at the head of Los Trancos Canyon from the bunkhouse last evening, about 9:30.

Jan 7, 1932 -

Alp. Cr. R. 9:30 A.M., bright sunlight. Heard a coyote over toward the head of Los Trancos Canyon in broad daylight, as above indicated. It howled for several minutes; I have heard coyotes howl once before in the daytime - in early afternoon on a sunny day from out of a deep gorge in the Selkirk Mts of British Columbia the last week in July of this year (the Rocky Mts. Goat Place).

Mar. 20, 1932

Alp. Cr. R., by bunkhouse; 7:30 A.M. of a bright sunny morning; heard one (possibly two?) coyotes yelping and howling in the direction of Los Trancos Canyon for a period of a minute or so. The ranch dogs barked a return challenge, as they usually do. #

6:35 P.M. just dusk; still light enough to see crows together in

the quail measure, because they were silhouetted against the sky, but too dark to do any other kind of work. Heard what must have been two coyotes yelping and howling down in the direction of Los Brancos Canyon, for about three minutes. No further cries heard up to 9 P.M. (time of writing these notes).

Mar. 21, 1932. See under *Lynx rufus*, page 2, this date, for note on abundance of coyote dung on the Alpine Buck Ranch by Leo H. Wilson.

Mar. 27. Heard coyotes (two, I think) calling at about 6:45 P.M. from Los Brancos Canyon. The sun was still shining on the hillsides, although the canyon itself was filled with shadow.

April 8, 1932. Alp. Co. P. by hunt house. 9:10 P.M. (dark; new moon) Heard a coyote for three or four minutes, in the direction of Los Brancos Canyon. It gave short yelps and barks but no long howls.

²⁴ April 11, 1932. Alp. Co. Ranch, by quail measure; about 4:45 P.M. - not yet dark. Heard a coyote howling in the direction

of the pasture back of McTellan's house. Two or three days earlier, at about the same time of day, I heard one also.

May 12 - Alp Cr. Ranch, at great distance (- Q. D.).
5:30 P.M. - bright afternoon sunlight.
I heard one, or two (?). coyotes howling from the pasture on top the hill (back of B. McTellan's house). This is certainly broad daylight.

May 21 About 7:15 P.M. (dark) I heard one for about 10 minutes - same place as above.

May 23 - About 6 P.M. - still sunlight. I heard a coyote several times during 15-20 minutes, from same place as above.

June 8 - See under Lynx p. 6. for record of two coyotes caught by goat trapper. I heard a coyote, same place as above, about 9 A.M. about June 3.

June 12. See under Lynx again for ^{goat} trapper activities. This evening, about 6 P.M. I heard one howling down in Los Pinos Canyon where the trapper has his traps set out.

Canis ochropus

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June 19 - Heard a coyote calling down in Los Trancas Canyon at 7:32 P.M.

July 4 - See under Lynx, pp 6-7 for record of trapping 35 coyotes, by Gant. trappers, in Los Trancas Canyon. Ott, the trapper, estimated that the 35 included three litters of young (some of his cats were pups, you see).

June 22 - Heard a coyote at 6:30 A.M., vicinity Los Trancas Canyon.

July 24 - a.p. C. R.; heard about 2 over at lower end of "quail pasture". The trappers evidently didn't get them all.

July 25 - Heard one; same place as above.

Oct 5 - Heard at least two at the upper end of the Los Trancas Canyon last night.

Feb. 9, 1933. - One heard again from the Los Trancas.

Dec 19, 1933 ^{Stomachs of} Coyotes trapped by Edmondson, State trappers working under Gordon H. True, Jr. (Economic Biologist, Div. of Fish. and Game), on quail refuges in vicinity of

Palmdale, L.A. Co., Calif. 1 game
following state:

Oct 7, 1933 - full - 1 entire ground squirrel
1 front foot of jack rabbit ^{used for}

Oct 8, 1933 - full - feathers of road runner,
small amt. of rabbit
fur; large quantities
of fur and skin, also
feet and bone fragments
of a bob cat (1). ^{used for}
^{game}

Oct 2, 1933 - 1/4 full - fur of house cat ^{used for}

Feb 19, 1934. Donald. McLean told me today
that one of the coyote stomachs which
he examined (he is publishing a
report in C. F. + G. ab. M. vol. 1) contained
11 ground squirrels, full grown. He
said the stomach was distended to
the size of a big goat bell (diam.
perhaps 6" x 9")

Once (about a month ago, I think)
he saw a ♀ coyote in heat with seven
♂s in pursuit. His attention
was attracted by the continued yapping
of coyotes, although it was full
daylight ~~early~~. Presumably he saw the
♀ running fast and in a straight
line, and making no noise. In a

minute the first ♂ came in sight, following her trail, and yapping; the other 6 trailed along at intervals for 10-15 minutes, all following the same trail, singly. The trail taken by the ♀ was a line right across country, at least for the distance of several miles from which they could be heard. McLean accompanied them by sighting along the trail in both directions at the point where he suspected they would be underneath a pine while he was watching them. He thinks that one ♂ probably started out after this ♀, and that the other ♂s came across the trail during their wandering, possibly being attracted in addition, by the noise that they, too, took up the pursuit.

Some more ^{wyde} stomachs, sent by Hayes earlier than any of the above, are here recorded.

Locality	Date	Contents
6 mi. W. of Pennis (A2)	March? 1933	parts of a cottontail
"	" 2, 1933	belly hairs of a

deers, probably a dead one.

Examined some coyote faeces picked up on the Alp. Co. Ranch, as follows:

No. of faeces in lot (estimated)	Locality	Date of collection	Contents
1	Mindogo Rd. by Mindogo Creek, W. Va.	2/25/33	Bones, whiskers, fur of <i>Sylvilagus</i> & <i>O. Bachmani</i> .
2	"	2/26/33	Bones, fur of woodrat - 45% fur of dog? <i>C. canis</i> 55%.
4	"	2/23/33	Fur, whiskers, fur, whiskers of <i>Sylvilagus</i> & <i>O. Bachmani</i> ; fur, whiskers, teeth, fur, long bones, with fur of <i>Neotoma</i> ; fur, fur of <i>Microtus</i> ; fur of <i>Peromyscus</i> ; fur, fur, teeth, fur, long bones of <i>Citellus</i> .
3	Small behind quarry.	2/24/33	Fur, long bones, teeth, fur, whiskers, fur, whiskers, teeth, fur, long bones, fur, long bones of <i>Neotoma</i> ; fur, teeth of <i>Citellus</i> ; long bones of <i>Peromyscus</i> or <i>Rhithodonta</i> .

Stomachs taken by Jake Ott, trapper, on the Alp. Co. R. are as follows, as to contents (next page).

- ♀ Nov. 27, 1933 1 ground squirrel
 ♀ Nov. 25, 1933. Meat and fur of
 ground squirrel;
 body of Peromyscus
 m. gambelii; fur
 and claws of wood rat.

Stomachs taken by Chas. Edmundson, for Gordon
 H. True, Jr., were as follows.

- ♂ 2/27/34 Near Palmdale, Calif. fur, feet, bones
 of 1/2 grown
 brush rabbit.
 Bone of rabbit hair
 ♀ 11/2/33 " " " "
 ♂ 3/1/34 " " " "
 ♂ 11/1/33 " bait
 ♀ 2/7/34 " 1 Peromyscus m.
 gambelii; fur
 of ground squirrel;
 fur of rabbit; fur
 of kangaroo rat;
 1 prairie rat.
 ♀ 12/2/33 " Fur of rabbit;
 bait

7/10/30

Citellus beecheyi

Los Banos Game Refuge, Merced Co. Calif.

All apparently occupied burrows marked with stakes with streamers along west side refuge from n. end Ruth Lake to northern boundary. In doing this it was remarked what a very large proportion of burrows were old and covered with cobwebs. Skulls were in a few cases lying about, and, dried skin. Dens and tracks of coyote were in evidence, also about a dozen much enlarged burrows which seemed to belong to predatory animals. Question if it is the rise of water (as yet 100-300 yds away!) or the activities of predators which are responsible.

7/19/30.

See behavior (indifference) regarding *Citellus* under heading *Citellus*.

7/22/30.

Squirrel burrows on S. side L.B. Game Refuge west of Mud Slough marked. Squirrels here are much more numerous than on west side of Refuge, being quite common on the knolls just west of mud slough.

Late in A.M. A squirrel seen to swim a small pond about 25 ft across! I first caught sight of him when he was half way across, and moving rapidly. On emerging at the opposite side he paused a moment and then rolled and kicked in the dry dust

Citellus beecheyi

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to dig himself. After doing this for about two minutes he sat half upright about 4 minutes watching me, then rolled in another place for a moment, sat upright again for a space and then proceeded down the slope again to where his burrow was, about half way up, and disappeared.

Had this squirrel so chosen he could have crossed 50 ft to one side or the other of where he did and it would have been only 3-4 ft wide with a depth of 2 inches or thereabouts. The pond at the spot where crossed was perhaps 4" deep in the middle with a very sticky mud bottom. He seemed to swim, no walk, and all but head and top of back was submerged.

7/29/30

L. B. G. R. During the census of squirrel burrows of the last few weeks many nearly complete skeletons, often with hide adhering, have been found at mouths of burrows.

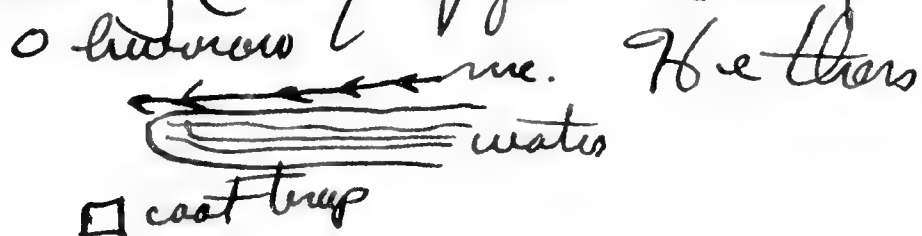
This probably a result of the poison campaign of 2 yrs ago (before refuge was bought by State) rather than activities of predators (See notes under *Taxidea*, also).

3/17/31

L. B. D. Ref. (See census notes for emergence from burrows). At coat

Citellus beecheyi 3.

trap no 4 two squirrels were
observed feeding on the whole barley
inside the trap. As I approached one
ran out through the 2" chicken wire
mesh and disappeared into its burrow
100ft away; the other crouched down
very flat on the ground among the
long barley sprouts inside the trap
and stayed there without moving until
I was 15ft away (my approach had
been thus:



made a dash for it and was almost
intercepted by me at the water but got
safely to his burrow. There is a squirrel
hole about 6" deep so far, inside the
trap, at one corner.

3/21/31. L. B. D. Ref. Hole mentioned above goes
down out of sight now.

Salmon Slough - Cammore trap no. 3:
This was baited last night with an old
piece of fish and a rabbit which had
starved to death some days before; this
evening a squirrel was in the trap -
I left him over night.

3/22/31 Squirrel taken home to Berkeley. The

rodent had been gnawed slightly at the side of the neck, and one hind quarter was extensively eaten at the thigh, being held at one place only by the bone, and the skin on one side.

3/23/31. The squirrel is much more apprehensive than the rodent (see *Sylvilagus* this date) it moves nervously to the far side of the cage, or climbs to the roof, at my approach and paces for two or three minutes at a time every one in a while.

4/13/31 L.B.D.R. by m. bridge over M-Slough. A youngster about 5" long (body length only) ^{was} frightened from open place and ran into a hole, as I know by this is 1st one seen this year.

4/23/31 L.B.D.R. Youngsters this size are now commonly seen. 4/27/31 Youngsters this size now abundant.

5/24/31 L.B.D.R. Cloudy, dark, mainly squalls - but not enough to make the ground really mushy; ^{fitful} sunlight. Some squirrels out, but not many; ^(see census) one seen as young something like *Peromyscus* (size of a mouse). Later - two squirrels seen

Citellus beecheyi

5.

running away at my approach while the man was actually coming down fairly hard (although it had just begun to do so).

6/2/31 L.B.D.R. A squirrel seems to take refuge in the same tree that the cottontail has used so regularly (see under *Sylvilagus*).

6/4/31 Study made in connection with a *Dafila* nest which was alleged to be robbed by squirrels (see under *Dafila* for mammal account).

5:10 I arrived (see under *Dafila*)

5:58 - Sun is well up but it is only just beginning to get comfortably warm. All at once about 60 ft away I suddenly saw from a number of little hillocks five squirrels, some crawling, others *Cott* upright surveying their surroundings; it looks like a family group, although all are of a size, and evidently they have just come above ground. Presently, the coast being clear, they began to move about from hillock to hillock and weed clump to weed clump in that stealthy manner

shown by so many diurnal birds and mammals which are ground dwellers and have enemies from which they must hide - i.e. a few rapid steps or a little run, hugging the ground, and then rigidity. Two of them stayed together, digging in some recently ploughed dirt and feeding on something which they found there; they would crouch belly to earth and scratch a little hole then pick up whatever it was they found and sit up straight, on guard, while they ate it; the others wandered off drowsily, one coming within 30 ft of the car (shades drawn), and all quite at ease regarding it.

Presently others came out and I soon lost track of the family group as they gradually scattered. One squirrel was busily pulling over the shorter stalks of

("rush grass") along the edge of a "slough", standing up on his hind legs and nibbling the "fruit" or seed part, which is feathery and



near the top; often times he would be completely buried out of sight and at such times he moved unhesitatingly as though such concealment gave him a chance to act and he himself - i.e. not particularly suspicious or full of self-doubt.

Later - a squirrel was hurrying by stealthily runs and ^{quick} pauses for inspection to a certain outlying knoll, and when he got there he crouched down and began to work at something, as though digging and eating; all the while he fluted his tail high in the air, ^{excitedly}, spasmodically as though it were a signal to his kin. Whether it was a signal or not I do know that it was the most conspicuous part about him - in fact the only part that I could see most of the time - and that immediately another squirrel came hurrying up from another direction and joined him, and they fed side by side for half an hour or more.

At another time ^{two} squirrels ^{were} exploring the long grass near the nest, coming from opposite directions, and when they were quite close they approached each other

Citellus beecheyi

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slowly, and it turned cautiously, and
touched noses and then revolved whiskers,
[that is it was first  and then
 - , each one treating his head a

little bit side wise] after which they
passed each other and kept on with
their business; it was like a greeting.
Late ~~still~~ ^{sometimes} Squirrels have been coming and
going within 4 or five feet of the ~~setts~~
nest but without venturing nearer,
or, indeed, seeming to be aware of
it - this before the ♀ has returned (although
it applies after as well).

At about 9 A.M. (the ♀ spring
had been on for a long time) The man
with the tractor, and dog, went by
at about 250 yds, where upon
nearly all the squirrels, although
not actually retreating, yet stood
up - peg like, and motionless, and
eyed it as it passed. The tractor
continued to move about in
the distance, thereby causing many
but not all of the squirrels to ~~get~~
continue sitting up on guard.
I say many but not all, for on a

Citellus beecheyi

7.

particular little hillback, or sandy bank one squirrel was wallowing in the dust, ~~lying~~^{sprawling} on his belly with legs ~~feet~~ outstretched fore and aft and then rolling over on his side for a moment and kicking, then gathering himself together to look up for possible dangers and then the whole over again. Once he rose up to watch right next to a second squirrel. (I forgot to mention that there were two) which had held its sentinel like pose all this time, and as he stood so close to the other as to actually touch and back to back first, then partly side-wise, ~~they~~^{strobes} looked awfully like wooden soldiers. This rolling I saw again later, on part of another squirrel.

Another squirrel, off by himself, was standing up in a cluster of Scaevola plant nibbling off the tops; sometimes he would hold the branch with both forepaw and nibble just the ends, sometimes he would burrow about at the base of the plant and pick up small pieces of something which he held in his ^{paw} and nibbled at upon rearing up again. Once I saw him

the local ground squirrel - must be a *Citellus* - feeding upon the dead bodies of ~~some~~ jack rabbits and of its own kindred mangled on the highway by auto mobiles. In one case E. saw one of these squirrels standing on its hind feet, holding a small chunk of meat in its forepaws.

July 23, 1934. Summer ranch (N.W. 1/4 Sec. 17, Twp 7S, R3W),

Santa Cruz Mts. Elev. ab. 2000. Squirrels are very abundant here, especially 3/5 grown young. They are tame, too, working unconcernedly within 30 feet of one at times. They have clipped ~~the~~ the heads of nearly all the thistle plants (*Silybum marianum*) which grow in extensive patches around the cabin.

Today I watched one for about 15 minutes as I lay concealed behind a screen, within 12 feet of where it was feeding. It would climb agilely up into the very top branches of the spring thistles and, balancing there upon its hind legs, reach up and seize the sharp spring thistle head with its forepaws and hold it while it clipped the head off at ~~its~~ ^{the} base with its teeth. Then, still standing in the top of the plant, it

Citellus
would gnaw away the base of the flower head, ¹⁰
at the point where it had been severed from
the stalk, until the seeds were exposed. Then
it would pluck out, skillfully pulling them out
its teeth and eating only the kernels, while it
still held the prickly flower head between its
paws. One by one the empty seed husks
pattered through the leaves of the thistle plant
and rained downward to the ground, while
the pappus, often but not always severed from
the husk, floated downward also. Beneath
the thistles the ground is carpeted with
straw pappus and empty seed husks. I
saw no seeds which the squirrel had
dropped uneaten, which means that if
the animals destroy most of them they must
be factors in preventing the spread of
thistles. However, squirrels are not the only
thistle-destroying agents by any means, nor
are they indispensable in this regard, for
horses ~~eat~~ will clean a pasture of thistles
quickly. When my squirrel had finished with
one head he climbed about in the plant

hold onto the bush with one hand, as though to steady himself, and hold something up to his mouth with the other. Another ^{one} kept drinking a bullock to survey the country for an instant and then would run down and over to a particular *Suaeda* covered mound and diving into the thickly growing weed, would run nose about, ~~or~~ stopping now and then to raise his head and look about. One, in eating something which he found there I saw ^{descend} scales of or chaff of some sort fall one by one.

1:15 P.M. One squirrel started piping and when I looked over there it was apparent that some sort of general alarm had spread throughout the district for I counted some 6 or 7 squirrels in widely scattered places all looking in about the same direction. I could see nothing to make them do this, myself, and presently the alarm subsided.


When I left at 1:40 ^{P.M.} it was the same, only less the center of attention there. At 2:52, when I returned, there were no

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Citellus beecheyi

squirrels in sight. Shortly after I had stopped, and all was quiet I saw two but upright forms, perfectly motionless, surveying me. Later they dropped out of sight again into the long grass, which meant, I suppose, that all was well in squirrel town.

3:20 The stifling heat is about to break; the regular afternoon gale is just commencing. Looks as if the hot noon hours are not hours of opportunity for the squirrels, I can only see two at most latterly and usually not that

3:25 A pinkish squirrel has just appeared out of the grass to take a turn at watching. He stands straight up, and can (and does) face about in different directions without putting his front feet to the ground. After a while he lowers to all fours, arches his tail in a peculiar lively fashion which I have noticed they do when on the ground.  and sets off through the grass.

4:10 Nearly every squirrel that I watch sooner or later ~~sets~~ commences to feed on the tops of the Sunda bushes;

certainly they are doing no damage to agriculture here! Perhaps they are eating more than usual at this time of year, in preparation for the coming aestivation (if they aestivate here, which I doubt); one shot 20 mi. S. of here had great layers of fat on it - at any rate they certainly spend a great deal of time eating.

6:10 Sun is getting low, wind strong and gusty making a continuous roar past the corner of the car - so it is every evening after noon, the cold air from the coast, sucked in by the hot air which all day has been rising up from the baking floor of the valley, blows in like this usually till around 1 P.M. of the next day - and makes ones tent rock and buck and flap like a livethump.

Saw two squirrels and two meadowlarks all on one level in the far distance and then - as usually happens when one is watching animals - nothing

happened until just as I lowered the binoculars to shift my aching arms and then, while I was watching with my unaided eye and it was too far away to see the details there was a commotion of some sort: one of the meadow larks jumped up and lit and then jumped up and then lit again and each time it jumped and moved one of the squirrels jumped and ran with a flourish of its tail, but whether the squirrel was chasing the lark, or vice versa, and whether it was play or earnest I could not tell, and by the time I had the glasses on them they had all subsided. Seemingly it was not a very serious encounter however for the next morning one of the squirrels ran up behind a meadow-lark - to within three or four inches - whereupon the bird gave a little run and stopped, the squirrel stepping up again passed him again within a few inches and kept on moving, the lark this time remaining immobile.

Citellus beecheyi

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6:15 - Another ^{part.} section of my sector:
A squirrel was just seen carrying a
large mouthful of grass crosswise
in his jaws. The bunch seemed quite
thick but not very long, not projecting
much beyond his whiskers, in fact.
Several times he disappeared, only to
reappear further on, moving in one
direction, and I think this load of
grass is to line the underground
chamber - an activity which
evidently does not cease with
the graining up of the young (which
appeared above ground)

6/6/31 T.B.D.-R. Example of contrast in
textures of 5 yglilogs and *Citellus*,
have lost 2 live *Citellus* two days
in succession because they were able
to find (and make by graining) weak
places in my cage which I had
successfully kept cottontails in
previously.

6/7/31 T.B.D.-R. Observation on caged animals.
There is a little bubbling undertone
following the sharp explosive alarm
squeak - hard to put in print but like this
check, bu bu, bu bu. It can not ordinarily be
heard in the field (the bu, bu) because so faint and
low pitched.

Citellus beecheyi.

8

sign either of squirrels or of old burrows on this part of the Ranch since I have worked here.

Feb. 5, 1933. Saw another ground squirrel, on the road from Menlo Park to Portola, ab. $1\frac{1}{2}$ mi. w. of Menlo Park.

Feb. 20, 1933. Another, on west end of Dumbarton Bridge approaches, San Mateo Co. Also at the mouth of Las Trancas Canyon, same place I saw the jack rabbit (*Lepus*, p. 13).

May 9, 1933. Alpine Ranch, at Ralph's house.

I caught one of these squirrels in a box trap there, this being the first one ever noted in the region. The incident goes to show how this, and other species, can slip into a region unobtrusively, and never be noted until it has increased its numbers to a considerable extent. No burrows, noises, or other signs of squirrel have ever been observed here since I came, and for a considerable time before that, according to Buster McCallum.

Aug 7, 1933. Reforming, Lincoln Highway. All day long we have been observing

until he found another ^{Citellus beecheyi} - evidently
by sight rather than smell - and
soon, one after another.

Sept 4, 1934 - Oct 4, 1934. Summer Ranch, (N.W. 1/4
Sect 17, Twp. 7S, R 3W) San Mateo Co., Calif.
Sept 1 - 5th Rapley poisoned his 240 acres and
I poisoned my 100; we killed at least 90% of
the squirrels. During the entire summer
prior to this, 2-4 red tails, resident mated
pairs, and occasionally some young, had
made my ranch part of their daily hunting
ground. They were to be seen each day. The
resident pair of golden eagles were also
visible nearly every day.

The day following the squirrel poisoning
saw just one hawk, and from that time
until about 3 weeks later I saw no
red tails and no eagles. I had begun to
think that they must have died from
eating poisoned squirrels, but at the end of
about 3 weeks they all began gradually

Citellus Beecheyi

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to put in an appearance again
so that I knew that they had merely
been forced to seek food elsewhere.
Wm. Condon, my neighbor on the north (640
acres) failed to poison at all that year,
which, ^{circumstance} provided a large number of
squirrels for the birds even though the
total available supply had been
markedly reduced.

P.M. I drove up upon a foraging squirrel before he saw me. It was 60 ft or more to his burrow, but instead of crouching in concealment, or taking to the nearby marsh grass, or showing fight, like a more adaptable animal he made a bee line for his distant burrow oblivious of all else. Paralleled his course and then veered into it diagonally, trying to head him off, but in vain; all I succeeded in doing was to run over him about two feet from the burrow - he dashed right under the wheels. Later, another squirrel, also far from his burrow, was so oblivious to all else that he fell into another burrow on the way, rolled over, got onto his feet and kept running until he got to his own. The burrow into which he tripped was small, perhaps recent, and hard to see, so he may be excused for falling in, even if not for climbing out again.



11/2/31 Alpine Creek Ranch, San Mateo Co., Calif. Squirrel poisoning operations. Squirrels are not numerous at present on the area, on account

of poisoning operations of previous years. They were present in the cornfield (see quilt notes) below the swimming pool last summer but were wiped out by poison (strychnine barley), and I have never seen one there. They are present around the Alpine Buck Ranch (Gouverneur place), and in a few places around the "Mindogo district" (see *Lophortyx* for 11/2/31), notably in the fields below the "tumbledown shack"; mostly they have their burrows among the rock and-croppings, Mc Lellan, Jake, and Zivoni put out about 75 lbs. - altogether, working about as follows - Zivoni 8 A.M. till about noon.

Mc Lellan 8 A.M. till about 2:30 P.M.

Jake Noon(?) till about 2:30 P.M.

One readily sees that had there been many squirrels in this extensive and precipitous country it would have taken them a week. I saw only one place where poison had been placed - i.e. among the rocks by the Skyline

Citellus beecheyi 17.

Blind, where a few scattered bunches of barley were present around the mouth of a burrow, and a dead squirrel was lying just at the entrance. They saw that the squirrel-infested areas are all out in open country, far from brush, and where there are no girds.

February 3, 1933. A fine warm spring like day, the second or third following a week of cold, stormy weather. Saw my first ground squirrel of the year, by the roadside 100 feet from the west end of the Dumbarton Bridge approach, where the railroad track parallels the bay shore.

On the Belpré Creek Ranch, an hour later, I heard a continued piping which must have been a ground squirrel. It came from somewhere in the direction of the Corde de Madera Creek Canyon (where the county road goes). Perhaps the squirrels will re-invade this section of the Ranch this year. There has so far been never a

Didelphis

1

5/8/31

About 3 mi N. of E. of Los Banos, on
Pacheco Pass Road. Merced Co. Calif. A
dried carcass of a large individual -
flattened out by auto wheels, seen on
a bridge over a well-irrigated
ditch.

10/19/31
^{on}
_{these}
_{about}

Mill College, Oakland, Calif. An
opossum practically (or entirely?)
full grown was discovered curled
up asleep in a "steam pipe shut-off
box", by a little dog, which was out
for a walk with its lady. The
"steam p. shut-off box" is the box
sunk in the ground and surrounding
the steam pipe at one point, where
there are some




suppose (haven't seen the place myself
yet), at any rate the steam
comes out of there all the time, and
it is nice and warm inside.

For about three days it was
kept in a packing box, covered
with a glass door, in one of the
lab. laboratory rooms. It gave
the impression (to the people there) that
it was higher nature - due to the fact



Didelphis
that it remained curled up, and breathing
very slowly unless disturbed, when it would
sluggishly turn its head and grin from
ear to ear — but apparently never lay
to bite. It refused all food (pieces of liver)
given it during this time.

When I got hold of it 10/²³/₂₄/31, it was as
sluggish as before, and was easily tipped from
one box into another, and moved by ear
several inches without its showing any
disposition to fight, or even to escape. In the
evening I gave it two eggs (hen, unbroken).
at 9 P.M. These were eaten, so I gave it
four more, and these were also gone by
morning. Half-shells and smaller portions
of shell were left, some of them seeming to
me been crushed either by chewing or
by being stepped on. In no case was the
shell intact enough as to show any
lateral hole in the side (as this ,
or example). The animal had an untidy

Didelphis

3.

looking secretive, partly blind, in the
corners of its eyes, as though it might,
indeed have been spending most of
time asleep. It awakes, at no time during
the night, and only once during the
day (2 P.M.) did I find it asleep. All the
other times same this one, it was crouched
in the corner of the box with its head
turned up at me - being.

10/24/31 Brought the animal to the
Grine Creek Ranch and put it into a box
with some straw and 12 hens eggs.
10/25/31 Ate about seven of the eggs last night
and (either) spilled out (or drank ??) most of the water in
the dish.

10/27/31 The remainder of the eggs gone on this, my
next visit. A cage made; fish & milk & apples
left in side. The animal can be handled like
a mouse, i.e. by the tail, ~~and~~ with same
precautions regarding fore feet on the ground or
other object. Occasionally bites weakly at

Didelphis

a stick, but not hard enough to make
any marks, and never growls.

10/30/31 (next visit). The 3 apples, the milk,
the fish, and the water were all gone. I put in
more milk, water, and four bananas. That
evening the possum was out (he spends the
daytime hours inside the nest box, and
roughly only a feeble grin when poked), and
was frightened by the light of my flashlight.
He showed his characteristic meager mental
endowment by blindly butting up against
the cage wires at the far end of the cage farthest
from the nest box entrance, instead of
hitting into the nest box, as a more
intelligent mammal would have done when
hunger. Its eye shine is light orange-yellow,
about as in a coyote.

10/31/31 Bananas and milk gone (banana skins
present). about 1 1/2 cups milk and ~~large~~ ^{medium} amount
meat scraps & bones left
11/2/31 milk still present; left about 3 apples in
addition.

Eutamias

1.

8/29/31 Alpine Creek (Ralph) Ranch, San Mateo Co. Calif. Chipmunk heard squeaking in the brush in the cow lot (cornfield); one was seen, also, on 8/23/31 near Skyline Blvd. on the ranch property.

10/24/31 Alp. Cr. R. On steep part of Los Breaños grade. One heard scolding nearby, while I was putting on my chairs.
Dec. 20, 1933 alp. Cr. R. I don't know whether or not the following reaction was purposive, instinctive, or chance, but I can see how through natural selection it might become instinctive. . . Ordinarily chipmunks run in and out of my quail traps, through the mesh, at will, pilfering grain. Today I surprised one which couldn't. He raised about trying every where, but in vain. All at once, while he was clinging to the wire sides, I saw him rapidly squeezing from exterior (or rather from interior?) the grains of scratch feed which he had stored in his cheeks. The grains fell in a steady stream for an instant. The next

Eutamias

2

moment the steam ceased and
now the chipmunk slipped through
the wires and was away like a flash.

maculatus gambelii.

Dec 28. See 'under Lophantys, p. 637,
for evidence that a house cat killed
and ate a quail.

Felis domestica

1.

9/20/31

Alpine Creek Ranch, San Mateo Co. Calif. Orchard back of house, McEllan says he shot a large black and white (feral) tom in this place, and that it had a quail in its mouth at the time. It weighed 10-12 lbs, he said, and was very big and fat - also fierce and strong. It fought his small dog, and nipped the dog so badly that the pup was still on three legs 3 days afterward. After being shot in the guts it fell out of the tree it had taken refuge in and actually ran at the dog but was killed by McEllan. McE says he has been laying for this cat for some time.

July 23, 1932 Two of these are at large now. One, a "tiger" striped tom, was by the Q.D. this evening and a quail was sitting a few yards ^{perched on the cat} away. About 200ft further off was a covey, or at least part of a covey, of 1/2 grown young. The cat bounded off when I saw it.

Dec. 22, 1932. Got the above mentioned "tiger-striped" tom by the Q.D. this

2.

Felis domesticus

afternoon. It was in ^{very} good condition, although not excessively fat. It weighed 3913.0 grams. Its stomach contained two meadow mice (*Microtus*), and a few bones of what seems to be a brush rabbit. The stomach was saved, of course.

See *Lynx*, p. 11, and *Buteo borealis* column, p. 139, for evidence as to the "natural" enemies of cats.

See under *Lynx*, page 14 et seq. for an account of the rearing of a house cat kitten and a bobcat kitten together, their behavior being compared.

May 16, 1933 Alp. G. P., by Q. D. Shot a big old ♂ which was hiding between ^{the} two roofs of the shack, ^{near} a place where countless quail are very common. The quail saw him go in there, evidently for, I heard an excited pit-pitting a short time earlier. Stomach contents were one 1/4 grown brush rabbit. Weight was 3430.6 grams.

Sept 1, 1933. Alp. G. P., by Q. D. Shot a 4/5 grown black ♂. Its stomach was a partially digested *Peromyscus*.

Gulo luscus

Alaska. At Sequoia National Park
Lor Garrison told me, April 17, 1935,
that in Alaska he found that wolverines
would eat the discarded skins of porcupines
which he had killed. Most of the quills
were digested, he said, but a few were
to be found in the droppings of the
wolverines. Occasionally a wolverine
was known to die from quills piercing
its digestive tract and working into a
vital spot. In one case death was
caused, he said, by a quill entering
the heart of the animal.

Lepus californicus sp.

2/15/30.

1 mi west of West Butte, Sutter Co. Calif.
Rabbit seen running leisurely across clearing covered with scattered valley oaks near extensive slough in bottom lands. After a few moments it stopped and lay down in shade under an oak, remaining perhaps 20 minutes. Ears were laid back.

Later. Another (possibly same) rabbit secured from its form in same region. Form was a small hollowed out space about 16" long by 8" wide between trunk of small valley oak and a small pile of twigs, grass etc which had been lodged against tree during winter floods.

2/16/30.

North exposure of butte called West Butte, among Marysville Buttes. Rabbits plentiful, about 7 seen in course of 2 hrs walk. One seen to run to a stone wall when startled, and instead of remaining in the shelter there like a *Sylvilagus*, continued through and immediately out the other side, resuming its flight.

Lepus. (cont). californicus ²

5/28/30

Census of Jack rabbits. Los Banos Game Refuge.

(a) Olson Pond - 1

(b) Overflow pond from intake into Buttons - willow Pond. - 2

(c) Mud Slough - 1

(d) Arm of Mud Slough leading south toward Ruth Lake - 1


7/24/30

No census taken because of abundance and difficulty of keeping track of moving individuals. Youngsters about 6 1/2 inches long found in tall weeds and rushes by edge of a dried up pond; photo graphed. Banded in the ear, no 362873

3/1/31

Mount Los Banos I. Ref. Merced Co. Calif.
Mud Slough. Must be the rutting season, for while parked in the car just now, over looking a flat of about one acre I have seen 7 rabbits moving about as though on a scent. They would hop along rapidly with their noses to the ground, twisting and turning here and there as though following the windings of a trail, and every now and then stopping and sniffing at certain spots for several seconds before

Lepus californicus 3

moving on. In the case I am watching now there are two rabbits not far apart - as seems to be the case now in nearly every instance - but they never get very close to one another. One may progress toward the other, and then stop a moment, then the other will move on, perhaps stop, only to have the first one turn and move off in another direction. However, this continued restlessness - not much feeding - and the fact that they do this mostly in 2s indicates pairing. Also, I just saw two rabbits chasing a third heel to nose  for a quarter of a mile, twisting and doubling constantly and running quite fast. I think it was 2♂s after a ♀. Once when the 3d rabbit lagged a few feet I thought I saw the pair pause and the 2nd one attempt to "cover" her but just then the 3d rabbit caught up and the chase continued.

There seem to be a great many more jacks now than during the preceding 2 or 3 months, this being confirmed by the censuses. McTeller

Lepus californicus 4

says his dog put up more now than
~~he used to put up~~ also. In spite
of the fact that the rabbit population
has not been increased since last
summer by much, I think that
high water plus, perhaps the steady
shooting carried on by Mc Lellan
for the coyotes, had diminished the
local rabbit population. Now, how-
ever, with the advent of the breeding
season, the rabbits are wandering
widely, and this new population would
seem to be an influx.

3/22/31 L. B. D. Refuge just s. of 3rd tower.

I was crossing a peninsula when away
down at the far end - 200 yds or more
away I saw a rabbit running away -
toward the extremity. Since I was after
a quail hen which I had shot nearby,
at the base of the peninsula I did
not move much nearer the end
of this peninsula, but cut across it
nearly at right to the long axis. However,
the rabbit, when it came to the
end of the peninsula, which was ^{about} ~~nearly~~
250 yds away, did not stop and
crawl, as they usually do, but

Lepus californicus 5

promptly splashed into the water and headed directly across a channel which at that point was at least 50 ft across. For the first few jumps it made good progress but then it struck deep water and its speed was perceptibly slower, also its body sank down so that I could see little more than head and shoulders. For nearly a minute it swam thus, until on reaching shallow water on the other side it rose higher, made faster time, and at last leaped out and up the bank, and made off without shaking itself. While in the water its ears were laid back but when it reached dry land it elevated them as usual. This taking to water so readily was in contrast to the usual ~~hesitant~~ reluctance shown even when one is very close to them.

4/3/31 L.B.D. Refuge. See *Aquila chrysaetos* pp. 2-6 for account of escape from eagle.

4/2/31 See *Carnivore Trapping Record* for this date for note on a 3/5 grown jack found dead (poisoned) in one of the traps.

Lepus californicus 6

4/5/31

L.B.D. Refuge. Three jacks started up from near n. boundary fence all within a few feet of each other - look as if breeding season not over yet. On 4/2/31 I had saw two jacks standing near together for about a minute and then go out of sight into a gully, one following the other.

4/29/31

L.B.D. Refuge near W. bridge across M.S.L.

3 rabbits seen together as I drove by.

4/28/31

L.B.D.R. by 2nd Redtail camp, Three rabbits hopping in leisurely manner in a general northerly direction from the point 75 yds to the south where first observed to a point 100 ft to the no. beyond my tent. They kept pretty well together at first, but later one of the three lagged behind and did not ever overtake the other two while I was watching. There seemed to be no definite purpose to these actions; a particular individual would be in the lead, hopping a dozen steps and then stopping to look about, or smell at a weed and the others in its wake would usually stop at this same time too, particularly if they happened

to be close to the other. Then when the first rabbit moved on they would move on also, and if they quickened their pace to a run and drew nearer to the lead rabbit it would also begin to run - until runner and pursued both gradually slackened up to a walk again. Once, however, the lead rabbit, having stopped, suddenly made a rush, not viciously perhaps, at one of the pursuers, which immediately dodged to one side - where upon they again took up their erratic wanderings. They disappeared behind hillocks and dodged about so much that I could not tell whether it was the same rabbit or not.

Some day - a $\frac{3}{5}$ grown jack caught by the field agent's dog.

5/8/31

L.B.D. R. 3. of 31 types. One of them ran about here and there in the tall rush grass of a farmer's floodland, as I drove through with my gun. He kept his ears back and head low and turned back every time, he came to an open place - good sample of the skulking reaction. He never did come out into the open.



Lepus californicus

8

5/22/31

L.B.D.R. Mud Slough by trap
12. Jacksons still frequenting
each others company, apparently,
saw 2 together once before, and 3
together this time.

5/23/31

L.B.D.R. S. of Rath Lake, I saw a
rabbit with two very large swellings—
larger than a golf ball though smaller
than a tennis ball, and gave chase in
my Ford. What a ride!!!!!! I
broke half the water out, and jumped
the same deep irrigation ditch at least
5 times — for 20-25 minutes all I did
was hang on tight and watch the rabbit.
This rabbit may have been weaker
than a normal one; at any rate it
never ran more than a couple of hundred
yards, even at first, preferring to
squat with ears laid back, in
hiding. After the first 5 minutes
it would hardly ever run more
than 100 ft before squatting, and
could wait until sometimes I
was as close as 20 ft before
starting out and temporarily leaving
me behind once more. Sometimes
it would stop in full view on the

Lepus californicus 7

top of a knoll. Whenever it came to the afore mentioned ditch where it was out of sight it would duck down and start to sneak along down it, so that always I had to hurry up to it when it got into such a place. Twice it jumped across a 4-5 foot ditch of water, although preferring to run along parallel to it, the second time the ditch was about 4 1/2 ft and the rabbit's hind quarters landed with a splash in the water instead of clearing it. At last when I crossed the ditch again and came up to the knoll where it had been I saw it no where, and after some search discovered it crouched 4 ft down in a large, old, nearly perpendicular squirrel hole, panting violently and only the rump visible. Efforts to dislodge it by poking were unavailing so I got it out finally by gasoline & steel traps. The trapping half whine had grown that the rabbit made when hauled out lay on the edge of a trap chain was actually

hair raising, and it uttered the noise so incessantly that a strong fear-disgust reaction made the hair on my head, back and arms stand on end! (see ^{note} below, also).

6:30 P.M. Animal found dead - perhaps from heat but I hardly think from this alone because it was lying in the shade (in 2 sacks) and had a wet sock on top of it. Probably general debility + strain of capture!

Note on interpretation of emotion in lower animals: Whenever I am frightened, as for instance at appearance and noise of jack rabbit above - I always get (1) the sensation of being rooted to the spot (not running away necessarily, although this sometimes too, dependant on circumstances) and a wanting to crouch down in defensive attitude; (2) Usually a raising of the hairs of back, head, arms etc.; (3) A strong desire to yell, or almost growl, in tones of menace (even when I have a nightmare) (4) Always a strong feeling of rage and a desire

Lepus californicus "

to grab something and go after the enemy (this follows especially after the initial shock of fright).

Therefore: when we see - in a trapped mink for instance - the same erection of fur on head and back, the same crouching in attitude of defense, the "yelling" or growling, and the rush if the intruder gets too close - it seems proper to imagine that the animals' emotional state is nearly identical with that of man (higher rate, probably because of more rapid metabolism).

11/25/31

Ohall Ranch, Gordon Valley, Napa Co. Calif.
A Jack rabbit was startled by me from out of the bottom of a narrow (4 ft wide at bottom) wooded canyon in the high foot hills here. The whole canyon was dark by reason of the oaks, bays, holleys etc which choked its bottom. On several occasions earlier, in this same locality, I have observed yarks in the thick shady brush; in fact I don't recall seeing them anywhere else, although there are many acres of open parklike (live oaks,

hillside immediately adjacent. This must be just one more instance of the adaptability of this essentially prairie animal. In all cases where I have frightened the animals they have made off through the brush, out of sight, but have not gone out into the open.

January 11, 1933. Los Trancos Woods Road, ab. 4 mi s.e. of
Pantola, San Mateo Co., Calif. -

2 mi n.e. of the Alpine Creek (Ralph) Ranch. 5 P.M. About 300 yds. after I had turned on to the Los Trancos Rd. I saw a jack running ahead of me along a fence parallel to the road and six feet from it. The fence skirted the base of an open (dry) grass covered hill slope; on the other side of the road was an open grassy field. The country to the south, east, west, and north was partly wooded, but with orchards, houses and barns, and some fields as being they some what adapted to jack rabbit requirements. The

country as a whole is certainly far from being typical jack rabbit country. I have never seen jacks in this region before, although I have been here regularly since August 1931.

March 4, 1933. Mrs. Ralph tells me she has seen several jacks (she described their long ears, and declared they were not cottontails or ground rabbits) near where I saw the above.

July 20, 1934. Saw a jack for just an instant as it disappeared over the crest of a hill on the Ralph Ranch 25 ft. from the Skyline Blvd. and $1\frac{1}{2}$ mi. N. of the Alpine Road; this is in Buster Mc Lellan's pasture.

April 30, 1935. Saw a jack on ^{the} 25% grade sections of my right of way from Skyline Blvd., adjacent to Ralphs. I now suspect that this influx of jack rabbits may be due to the modification of this region by prolonged overgrazing. Tall perennials have given way to short annuals on all this grazing area, thus resulting in a more open type of terrain than in former days.

This conclusion is further

Lepus californicus

14

borne out by the statements of my neighbor, James Rapley Sr. (^{about} 72 yrs. old) who says that in former days the grazing land was overgrown by dense stands of wild oats. The oats, attaining a height of $2\frac{1}{2}$ to 3 ft., would of course not be suited to jack rabbit needs.

Lynx rufus californicus

1.

March 2, 1932. Alpine Creek Ranch, San Mateo Co., Calif. (Ralph Ranch). Time - 5:30 P.M.
Sun still shining, low above the mountain ridge above us. As Gordon, Tume, and I drove down the gravelled ranch road, past the little "lake" which is hidden among the trees, a bob cat leaped into view from the bushes which fringed the road, dashed across in front of the car at a distance of about 20 feet, and disappeared again immediately in the bushes on the other side of the road. He looked very dark as he went by; perhaps the humid coastal residents here are all of this hue.
About a week ago a mountain lion hunt was held by James Ralph, "Leg" H. Wilson, and some friends, in this country. They had a pack of dogs and were out from early dawn until about noon but said they had failed to locate a lion trail or even see a track. They did trail a bobcat to the spring, and kill it, and they say that bobcat tracks were to be found everywhere.

Lynx

2.

through the region — this was mostly in the Los Francos Canyon and adjacent hillsides. Coyote dung was abundant in many places, also, they declared. Les Wilson says that he believes that the recent reports of residents to the effect that they had seen a mountain lion in the region were erroneous; he believes that they were based on a bobcat. No stock has been lost and no deer have been found dead, which substantiates this belief.

April 15 (about) Alpine Creek Ranch, on road from Ranch building to the main gate, about opposite the little (muddy) pond. About 4:30 P.M., at least it was still sun light. As Gordon Lue and I were ~~driving~~ home a bobcat was seen just for an instant as it bounded across the road into the thick brush on the other side.

April 28, 1932. A mile north of the Alpine Creek Ranch, on the county road that leads down, past the Ranch gates to

Menlo Park; about 6:15 P.M., dusk.
As I was driving home, a bobcat
surprised appear from the steep
bank on the right and attempted
to cross the road. At this place the
road was bounded on the right
by a ^{nearly} perpendicular 20 ft. bank, and
on the left by a sheer drop of
about twenty feet; consequently
the cat, on gaining over the edge
and seeing the situation, turned and
ran down the road in front
of the car for about fifty feet. At
this I stepped on the gas (I had
been going perhaps 15 miles
per hour) and started to overtake
him, but too late, for in another
second or two, frightened by my
approach, the bobcat gave a
bound and a scramble, and
disappeared up the steep bank
on the right side. At the place
where he went up it was about
ten feet of ^{nearly} perpendicular
hard dirt at the bottom, with
bushes and poison oak overhanging
from the ten foot level on up,
it being less steep up above, apparently.

June 2, 1932. Alp Co. R. Chicken house. ~~The~~
~~last~~ Two nights ago Mc Allam
lost two of his turkey gobblers
right out of the chicken house.
The fence is 6-7 ft high, which
makes them think a bobcat
took the birds and not a
coyote. They found the heads -
and little else - down in
the ^{park} tree-filled canyon which
drops off at the edge of the
cider yard - the canyon
which I may ^{have mentioned}
earlier (under Butte, ^{E. canyon or canyon} this spring)
as being strewn with carcasses
of hens and pigeons. They
say that they would have to
go down there at 5 P.M.
to let the chickens and turkeys
out for their early morning
feeding, if they shut the
chicken house doors at night.
Of course, if they shut the
doors they wouldn't suffer
from predatory animals.
Mc Allam called on the
Biological Survey some time

Lynx

ago for a goat trapper — mainly because he didn't like to hear the coyotes howling at night, and also because he had lost chickens etc down in that canyon, at the time ^{last fall} when he let his chickens run loose in the 4 acre deer paddock and everywhere else, without trying to round them up at night at all.

Last week the local trapper commenced work — but no one knows whether he caught anything or not; he doesn't like McDellan and didn't speak to anyone. That was Zimone. ~~Last~~ A day or two ago McDellan complained about the lack of results and the main methods — to Poole himself personally (he thinks it was Poole), who happened to be down (probably it was just a field supervisor, though). McDellan Said he stressed the fact that the the government own property had more "varmints" on it than any other place around. This

had the desired effect. The Survey sent a Jacob H. Ott, of Ohio, down here, boarding him at the Ormendale Ranch. He arrived today and started to work (I haven't met him yet).

Ran Jacob & Buster McEllan now much damage from predators had been suffered by the neighboring ranches, and mine. He said about baby hogs at O'Neills and his own chickens. Hogs shouldn't be at large at that age; as for McEllan's chickens, well!! So much for politics.

June 8, 1932. Met Ott today. Says he will be working in this section during the month of June only. Has caught two coyotes (rapes) and one bobcat already, although he has not yet got out all his lines. He visits his traps every other day.

Buster claims that he could see the tracks in the mud around the chicken yard of the bobcat

that got his hunters the other day.

June 12 1932. Ott told me that he caught one more coyote and another bobcat since I last saw him., also one coon, but no skunks.

June 26, 1932 - Ott took me over part of his lines today, down in Los Francos Canyon. The sets were along (but not in) a trail which traverses the west side of the canyon, on the Alp. Cr. Ranch. He showed me two carcasses of bobcats which he had recently caught there and skinned.

July 4. Ott's time, allotted by the B.S., in this section ended June 30, and he is gone. He told Buster McCallan that his total catch for the Alpine Creek Ranch was 12 bobcats and 9 coyotes, of which latter a good many were pups. His total catch of coyotes in the Los Francos Canyon (part outside Alpine Creek Ranch and part inside (9)) was

thirty five!

Buster Mc Lellan said that another time, if he needed a gant. trapper in here he would know how to get one immediately. It seems that he had asked for one quite a long time before he actually got one, the fact that the Alp. C. Ranch was a refuge under supervision of the Division of Fish and game acting as a deterrent to the Biol. Survey. However, when

who lives about five miles from here, a sheep man and member of the Alp. C. Ranch Association, asked for a man, the Biol. Survey sent one immediately.

is a friend of Mc Lellan, and asked that the trapper be sent up to the Alp. C. Ranch - it was done right away, too. So, Buster says that another time, when he wants a trapper, he will get to ask the Biol. Survey for him.

December 15, 1932. Alp. Creek Ranch; second

pasture north, on the Pasky Place.
Day overcast, cold, much snow
on the ground in sheltered places.

As I came over the top of a bare
steep, hillside, and looked at the almost
slope and table land below, I saw
a large bob cat trotting across
the open exposure 250 feet down
the slope in front of me. He
saw me at about the same
time, and started to run in a
diagonal line past me toward
a wooded canyon at my back.
Running back the way I came,
I passed out of his sight behind
the hill and managed to almost
intercept him as he reached the
canyon. As I came in sight again,
he halted and stared; I fired
at him with the .410, and the
next instant he had vanished
completely, into the thick brush
of the canyon. Doubtless he was
unhurt, for I was about 200
feet from him when I shot.

A Mr. Sheridan (see letter
from Leo H. Wilson, about Nov.
21-30) who is U.S. Geol. Survey

Lynx rufus

trappers ~~and~~ for San Mateo County, applied for permission to trap on the Alpine Creek Ranch about three weeks ago. I (Ralph) referred him to Leo Wilkins, who referred him to me. I said no (that I may have a copy of the letter I wrote). On talking to me, Jordan explained that the reason he wanted to work the Alpine Creek Ranch was that he was trying to exterminate the cats and coyotes from the whole section. "Exterminate" was the word he used.

Feb. 14, 1933. Alp. Creek Ranch. A lion hunter, Bill(?) Edmonds, has been staying up here for several days. Today he got a coon and a ^{bob}cat, the first (and only, since he is leaving tomorrow) animals so far. The cat's stomach contained a woodrat. ^{Says in all the many} ~~Bobcat stomachs that~~

Feb. 15, 1933. Donald D. McLean examined he told me at the Museum today that three of the various bobcats whose stomachs he has examined he doesn't doubt that they eat birds. He says that a woodrat is as good a bait as anything for trapping cats. he has never found any bird remains although

the remains of domestic cat. In addition to this he once saw, while he was standing about 100 yds away, a domestic cat come around the corner of a barn, leap upon the roof, ~~and~~ ^{climb} ~~up its side~~ ^{up its ~~sides~~ slope} and over the top, its tail with hairs straight out like a bottle brush. Behind the cat was a bobcat, which clattered up the shingles of the roof and over the other side. The domestic cat squeezed into a hole too small for the bobcat to enter at this juncture, and while the latter was still hanging about, someone shot it.

Don said, also, that when he was about nine years old he and another boy found a wild cat den. It contained one blind kitten about three days old (its ears were still crinkly), but there was no sign of any other kittens or of the old cat; she may have been carrying off the rest of the brood at that moment. The nest was a depression, lined more or less, with leaves and debris, under

the spreading, low branches of a Ceanothus (possibly retutus?), at the base of the shrub. He raised the kitten on an eyedropper at first, not feeding it during the night at all, and kept it for about five years. It was allowed to roam about the house and yard just like a domestic cat. Sometimes it would disappear for several days but would always turn up again - until the last time. It would allow only Don to feed it and touch it, and even him it would not let fondle it very much. ^[like mine, see below] It would often purr, and jump up into his lap, but would soon grow restless, and even mewing if he petted it, when it would ruffle up and slap with one of its paws, sometimes drawing blood. While not exactly wild, or fierce, ^[like mine] it was decidedly independent. The domestic cats were always much afraid of it, and gave it a wide berth. It was a male. I forgot to mention that Edmonds

told me that a bob cat, after defecting, scratches once with each fore paw to cover up the paws. Unlike domestic cats, which paw about quite carefully, however, the Bob cat, according to Edmonds, just gives about one scratch with each paw, and if the soil is hard, the effort is entirely wasted. The two parallel scratches left, are diagnostic, however: If they are about as wide as the paw of the cat, and of course, indicate which way he is traveling.

However, see my cat report below.

Chandler (Human Parasitology), says that cats, ^{possibly} on account of this habit, have much fewer warm parasites than dogs, which are notably less cleanly.

Mar 30, 1933. Alp. Co. Ranch, road from Quarry to Ralph's back gate (opening onto county road), time about 2 P.M., sunny. As I drove through the wooded pasture a Bob cat ^{galloped slowly} ran from a clump of brush near the road, out across a small grassy open space and disappeared into the wooded canyon adjacent. He may have been hunting

small birds in the thickets along the road.

May 13, 1933. Today I got from Bill Hanes, of Elk Creek, Calif. (Glenn Co.), a baby Bob cat. The mother had been trapped a day or two prior to April 25 (1933), and had given birth to five young when discovered on April 25. The one kitten which was saved had its eyes open ~~April~~ May 3, and for this reason, assuming that it takes 10 days for the young to open their eyes, the trapper who found the cat and kittens (Harold Hanes, nephew of Bill Hanes, Stonyford, Calif.) estimated that the kittens had been born April 24 the night before he discovered them.

The trap was 11 mi. north of Stonyford, Glenn Co., Calif. Stonyford is 32 mi. west of Maxwell, on the state highway, and is in a narrow valley just east of the main crest of the Coast Range, but protected from the searing heat of the Sacramento Valley by a low ridge. The country is hilly, the hills being covered with various brush types, and is

thus a typical wild cat country. Cottonwoods and meadows, and creeks, occupy the floor of the valley, which is farmed, while brush occupies the stony hills; forest land is absent, occurring only on the high (at this time of year snow covered) ridges to the west.

Since capture the young bob cat has been nursing from a house cat which had two large (more than 6 weeks old) kittens. The house cat offered no objections to the arrangement and neither did the bob cat. At the time of my arrival (today), on the cat's 19th day, it was able to walk about, and even trot clumsily when in a hurry, and was practically as docile as a house-cat. At the very first when I picked it up it hissed and growled (the growl a tiny little hoarse noise), but it went to sleep as soon as it was placed on a sweater in its new basket, and never from then on has it growled or hissed at all.

To night (10 P.M.) it sucked

warm milk (with sugar added, as Bill Hanes says cat milk tastes sweeter than cow milk), from an eye dropper with alacrity and then was put to bed for the night.

20

↑
Age of
Rory in
days.

May 14, 1933 Very hungry this morning (9 A.M.). It kept uttering what in a hungry kitten of *F. domestica* would be a mew of hunger. However in the case of the Bobcat the noise was a short sharp, hoarse, peevish "reow!" (pronounced something like Reo (car) when spoken through the nose). This noise it kept uttering every few seconds, while it walked and trotted about the house. I fed it a little milk but not enough, evidently, for afterwards it continued its restless pacing and its "reowing", although entirely tame when being handled.

Took it, still yelling to Seth B. Benson's house where lives a Persian (pedigreed) cat and 4(?) kittens which were 38 days of age and still nursing. The bobcat went immediately

to the old cat, ceased yelling, and began to nurse. As the old cat was nearly dry, however, ~~she~~^{it} did not get enough to satisfy ~~her~~^{it} from any one teat - having a larger appetite than those of the Persian kittens - and would greedily attack first one and then the other, ^{that} crawling over and pushing aside the Persian kittens, and burrowing frantically into the belly of the old cat with its head, while pushing with its forepaws. Its teeth are already well developed, the canines being regular fangs and the incisors well developed, as also the cutting teeth. These teeth it must have used while suckling, for the old cat squirmed and meowed frequently, and every few minutes would get up and run off, dragging the Bobcat still attached, or in some cases frantically following. The Persian kittens did not hold on so nor did they bite. Their little teeth were incapable of hurting the mother.

As long as the Bobcat merely sucked, the old cat showed ~~her~~ it

no hostility, simply wailed and licked the nearest kitten, or the bob-cat, uneasily. But when the bob-cat would come up to her and make its decidedly un-house-cat-like révé-
seeming food, - her ^{pupils} eyes would enlarge and she would half crouch, and spit at it, once or twice nipping it slightly. These hostile demon-
strations had no deterring effect upon the pushing aggressiveness of the bob-cat, however. Eventually it got enough milk and curled up among the other kittens, peacefully.

Once Mrs. Benson hurt it slightly by opening a door against one of its feet. Unlike the Persians under such circumstances this little kitten growled and spit and shook away with fur erect. When the hurt subsided, it did likewise, however.

To night we took one of the Persians, a ♂, home to be a permanent playmate for the bobcat. ^(a ♀) The bobcat christened Rosie (referred to in here as "R"); the Persian Pami (referred to as "P"). There is a vast discrep-

any in proximity, vigor, and body size between the two. Although Pansy is practically twice as old (38:20 days) he weighs much less and is naturally more fragile, less aggressive. He eats much less, also, and is less active, sitting around instead of running about inquisitively; even his play is less boisterous, his bells and claws shorter and blunter, his mouth and nose more clainty.

Bill Hanes said that young bobcats, and also young coyotes, can go for nearly ten days without food before death ensues. He said that it was the usual thing for such youngsters to refuse food during the first three days of captivity, without suffering any permanently ill consequences. He said, too, that all bobcats that he knew of having been raised in captivity got mean at maturity toward all persons other than their keepers - just as Don McLean's did (see ante).

May 15, 1933 Pansy, after hunts Pansy in play by her rough hitting.

Parsie protests with little meows, but makes little effort to get away - partly, perhaps, because the smothering weight of Rosie, who is always on top, prevents. As soon as Rosie stops hitting for a moment, weak, mild little Parsie ceases the protest, often continues the play by innocuous little lites, and wrestlings, of his own.

Rosy is voracious in the extreme, consuming 2-3 times ^{much as} Parsie at each feeding. She uses her teeth in feeding, crunching the ^{mouth} glass medicine dropper until it threatens to break the tip. When we made a nipple for her out of a rubber ~~off~~ medicine dropper bulb (fastened to a thistle tube) she crunched and yawned so voraciously on the rubber bulb that it immediately became perforated with about a dozen holes, and squirted milk in all directions. No wonder the mama Persian became troubled; I wonder what ^{many} of bob-cats do, or if they feel it. Rosy also

hit the edge of her wicker sleeping basket several times, displaying an urge to exercise the developing teeth.

Pansy frequently licks Rasy, and then herself, indiscriminately, while they are playing. Rasy, however, does not lick either herself or Pansy very often, possibly because licking is an advanced reaction. I did see her lick her own paws once, in a slow, somewhat uncertain fashion.

Shortly after the first feeding this A.M. (7:15) Rasy displayed an uneasiness. She walked about but without going more than a few steps in any one direction, turning this way and that. I immediately put her into the sand box inside her cage and she defecated at once. She did not cover up the faeces, however, as do domestic cats (and ad. bobcats ^(yes) ~~there~~), but immediately turned and walked away.

Later in the day she went to the sand box to urinate, but did not get well onto the sand, and urinated over the edge onto the nest sack, instead. Pansy is

Lynx rufus

teeth marks 22
playful
Rosy!

better coordinated, going to the sand box and burying, then panning sand over the damp spot - although he sometimes fails to cover it with his more or less random panning. The sand box was an institution at the Bensons, who told me that the kittens used it instinctively and did not have to be taught.

Feedings for today were as follows:
7:15 A.M., 9:45 A.M., noon, 3 P.M., 6:30 P.M.,
9:10 P.M.,


Weights (grams) of the two as follows.

Rosy 589.2

Pansy 435.3

May 16. Iris color of the two cats:
[22] Rosy Bluish gray, with a faint yellowish tinge
Pansy - Bluish gray

Rosy keeps climbing, by means of her sharp claws, from the floor to my lap via my pant legs (jeans, a material resistant to foothold even of a claued paw). She also follows me about on the floor, recognizing me as the source of food. She displays

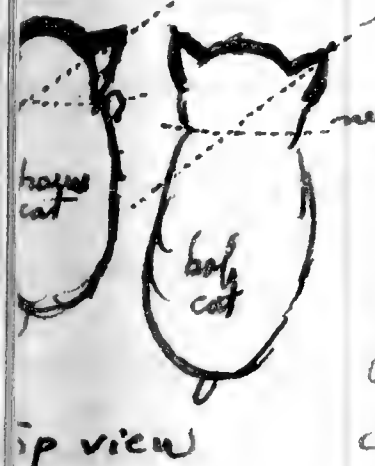
a boldness and agility astounding for her size and much greater than that of Pansy. She will leap from the table to a chair  and thence to the floor and will jump down from boxes from which Pansy hesitates and hang back.

When asleep she always holds her ears down and ^{forward} ~~back~~ (instead of up and ^{laterally directed} ~~forward~~ as in the house cat) in true wild cat fashion. Even at all times they are held that way to a considerable extent, also (except see page 31).



Now I really know why Pansy cries, and the old cat wailed, when Pansy bites. Putting my finger into her mouth while she was wrestling with Pansy I received a puncture from which blood flowed; puncture about as severe as that given by my (1 yr. old) sparrow hawk.

[23] May 17, 1933 Pansy purrs when stroked or scratched under the chin, the reactions being almost automatic.



in its infallibility. Rasy does not purr, however, the only time she has ever been heard to do so being the time when she was placed with the mother Persian; the purr was no different from that of domestic cats. Pansy watches the motions of my pen attentively, approaching very close; not so Rasy, who pays no attention.

Rasy's upward climbing tendency has increased. She keeps climbing from my lap up my arms to the back of my neck, where she will sit. Once she climbed from the latter station to the top of my head; her claws feeling slightly "thorny". She climbed up a ~~screen~~ vertical window screen to the very top (25"), then didn't know how to get down, finally backed a few inches and letting go, fell the rest of the way.

The cats have lost slightly in weight since the 15th; don't know why: Rasy 581.9; Pansy 409.7 (100.00)
Rasy scratched her chin with her

hind foot (left), in a feeble, uncertain manner. At about 10 A.M. she defecated, showing the uneasy, wandering actions of before, did not cover the feces up, but merely walked away.

This evening Rasy's climbing and daring leaping overstepped themselves. Leaping from the table to the chair (p. 23), she missed the latter and fell with a resounding thump to the floor, with her mind knocked out of her. Shaking her head several times, she crouched without a sound, stunned and unable for several seconds to use her hind legs. Presently she was all right again. Unlike Parry, she never makes a sound when hurt ^(except when stepped on or caught in door).

Photos ✓ May 18 Took Rasy out into the crush to be photographed. Unlike my young aunts (~~publ~~ article to be published; work done at Pomona College) Rasy showed no fear in her new surroundings, wandered about, at last lay down in the sun and went to sleep (but see page 84)

May 18, 1933. My query as to what a

Lynx rufus.

young bobcat would be fed upon in a state of nature, at this age - prompted by the cat's voracious biting during feeding - was spectacularly, and almost certainly correctly, answered this morning.

Noticing Remy sniffing in a curiously eager manner at a dead quail I removed the quail and placed before her nose a ^{dead} mouse (*Peromyscus m. gambelii*) instead. Instantly she sniffed it frantically again and again, then picked it up by the body and ran hastily about on the floor, apparently looking for a secluded spot in which to eat it. When Panny chanced to pass near, she brushed past him and kept out of reach of his playful gambolings. Presently she crouched down and commenced to bite and chew the legs and tail of the mouse, then, starting on one of the fore-legs, she chewed and crunched it, swallowing the macerated portions, just the way an adult cat eats a mouse. Presently the shoulder, and then the head and body disappeared down her throat, which until

now had never swallowed anything but milk. The instant, frantic eagerness of the whole act showed strongly the workings of instinct.

No wonder she chewed the rubber nipple and the glass eyedropper!

While this was going on Iak held a mouse up to Pansy's nose, but got no reaction. He sniffed it perfunctorily and turned away. However, a moment later he happened to pass the spot where Rasy had been chewing her mouse and smelled the blood and body fluids. Instantly he too showed interest, sniffing eagerly. At this I gave him a mouse, which he ^{seized and} carried off to ^{to carry it off out into the porch, where it} a dark corner. ^{to eat} He started in ~~on~~ it just as Rasy had, but his progress was approximately three times as slow on account of the small size of his jaws and teeth, and inferior strength. Rasy finished her mouse in about three minutes and came running over to Pansy. At this intrusion however, instinct asserted itself

again in Pansy, in a striking fashion. He gave a loud, menacing growl such as I had never heard before, and spat menacingly at Rosy.

It is more than likely (ask Bensons when they get back) indeed, that Pansy had never uttered these sounds before in his life, the circumstances (prey + danger of confiscation) never having been present. Even when I walked past him Pansy would make this sound, although I did not make any move to take the mouse away. Rosy never growled although she ran away when I approached within a couple of feet, and hung on so tightly to the mouse when I tried to take it away from her that it was pulled in two.

(But ~~now~~ now Sept 10, 1933, she guards prey as savagely as a ferocious dog).

About 15 minutes later, as both cats, but particularly Rosy, were still sniffing and running about uneasily, I gave each of them another mouse. Pansy got his down without trouble, but Rosy two or three times choked and gagged,

shake her head and had difficulty in breathing over some large mouthfuls of mouse guts. After this, their largest meal by far, both kits went to sleep in my lap - but they both moved uneasily in their sleep many times as though they might be suffering from some pangs of indigestion (they have never cried like this in their sleep before). See Lecomte and ?? (quoted in my bibliography at end of Lecomte's paper on Raptorial birds, to be published) on the reactions of young hawks to (live) mice.

Rosy liked the fur of both hare and muskrat, also his flanks; first time I have seen such extensive washing activities.

Rosy defecated in the afternoon, about 3, instead of in the A.M., as usual, did not cover feces up. Defecated on floor beneath bed yesterday. Dark corners seem to be preferred.

8:45 P.M. Rosy washed herself a bit, on body near tail.

No more mice fed today for

~~Page~~

fear of upsetting the kit's digestion;
instead, milk, 4 P.M. and 8:45 P.M.

May 19, 1933. 8: A.M. milk feeding.

[25]

Pansy now laps eagerly from a saucer, gets all his milk that way; Rosy still steps into it, gets milk up her nose, won't lap, has to be fed with eye dropper.

9:45 A.M. I rubbed some mice on my hands, then let the kits smell my hands; they became excited. When I gave each a mouse events took place essentially as yesterday:

Both began at the head end of their mice, gnawed the skulls without difficulty. This method of feeding is to shear off, by means of the carnassials, chunks from the carcass, masticate these chunks slightly, and swallow.

Pansy gnawed as before, but when he dropped a fragment and Rosy started to eat it, his possessive feeling did not extend to the point of trying to take the piece away from Rosy. Rosy did not choke this time.

Rosy held her ears up ~~and~~ while feeding in a manner not shown at other times:



Seven minutes after eating she showed the customary uneasiness, defecated in the sand box when I plunged her down there.

While playing, I saw her creep up upon (stalk) Pansy, belly to earth, and from behind a half-concealing table leg. This is the first time I have seen this fairly advanced form of play in either of the kits.

Fed the kits milk about 1 P.M.

Curiously enough, I have had to move the 'kits' basket into partial shade twice today because the sun's rays made Rosy pant considerably; Pansy was quite unaffected, visibly at least.

5:30 P.M. Both refused ^{fast} mice. Pansy paying no attention to his, Rosy carrying hers about for a while and then dropping it. Later she ate it, however.

[26]

May 20, 1933. Each rat ate 1/2 a mouse (hind quarters of two mice of which the fore quarters had been previously consumed); they always begin at the head end, still eat the guts, leave the hind quarters if their appetites are sated, never eat the tails.

As remarked earlier, Rony is not coordinated in his burying of feces or urine. More often than not he will paw dirt about in a place several inches in front of him (instead of where he has been standing), while treading on the contaminated spot. Occasionally he will dig a fairly deep hole (1 1/2" to bottom of the pan) and use it properly, afterward covering it up again. I have never observed him to defecate or urinate outside of the pan, although it is not certain that he has not done so.

Rony uses the sand about half the time, dark corners and places, rather to meet back the rest of the time. The sudden introduction of

mice in large quantities, in Rosy's diet (3 yesterday). has proved too rich. She has had diarrhoea^(exp?) - like condition to day, evidently causing considerable itching. Pansy, having eaten fewer mice (only one yesterday, I think) has not so suffered.

Since about day before yesterday both kittens have come to run eagerly toward E. or ~~the~~^{me} when we call "kitty-kitty-kitty", thus. Giving their food call. Of course they continually climb up our legs into our laps at all times, even when not hungry.

Cats, when asleep, may allow their eyes to come to rest in almost any cross-eyed position - like human babies, according to E. - as may be seen when one gently opens the lids without awakening the animal. Some of the cross-eyed conditions are most gruesome in appearance. The inner eyelid is ^{brown} about half way across the eye at such times, the pupils are all away.

Pansy's plaintive, whining mew is given under all gradations

of conditions of uneasiness, Racy, Hammer, has two cries, (1) a low, gentle, "conversational" "row", given when she seems not to be uneasy about anything, often when she is half-asleep; (2) a loud, hoarse, peevish "row", which intergrades with no (1) above under conditions of minor irritation, but which becomes an almost snarling, barking "yah!", uttered sharply again and again, when the kitten is very hungry, is chafing under confinement in its basket, or is unable to find a place (dark corner) in which to defecate. One hears this noise also the Parsys mew, especially when the cats are being carried in the automobile, inside their basket. The jarring and the noise disturb them; in fact a ride in my old Ford, over a rough mountain road, made them both temporarily quite wild.

Racy is entirely tame (~~and~~ ~~she is~~) when she is well fed and otherwise com-

portable, at such times climbing into ones lap and playing with ones fingers, pawing them and (when she gets a chance) biting them, but quite gently. Sometimes she will lie on her back, under ones conditions, and paw ones hands with all four feet at once, every now and then giving vent to her little "conversational" "meow".

[28] May 22. Pansy has this morning, under the stress of hunger, eaten the equivalent of two or three level tea spoon fulls of a mixture of "Cala Puppo" and "Cala Cat food", which she has hitherto condescended only to nibble ever so daintily. The "Puppo" is a crumbly, ~~luscious~~ biscuit-like food, the "Cat Food" a mixture of meat and vegetable matter.

Both he and Rosy attacked my hamburger as eagerly as they have attacked mine. In fact Pansy growled over it just as over a mouse, although not growling over milk or the

commercial cat food. ^{TP} Rosy would sniff the can cat food and then turn away, every time, until this evening I hit upon the expedient of mixing it with ~~the~~ hamburger. This worked wonderfully, the whole portion disappearing. Rosy at last began to learn to lap up milk - (inadvertently) also, for I put a small amount in with the above mentioned mixture - just enough to make a small puddle at the base of the meat mass. She got it up her nose at first, and drew back, but the great smell lured her on again, each time, and finally she lapped it up just as she used to ^{lick} ~~lick~~ the palm of my hand when I used to moisten it with milk.

The sides of both kits bulge now, after their meals of solid food - something which never happened before. They are less restless now, too, as a result of better feeding; they go to sleep shortly after eating, play and romp with each other, wave and climb up my legs

less.

After her nap this evening, Rasy yawned a wide mouthed yawn.

She voluntarily went to the sand box to urinate, also, this evening although she is still far from being house broken, defecating on the kitchen floor, in a corner this morning; when we were not at home to watch her.

The play of the two kittens, but especially Rasy, is becoming more violent, and more like the hunting tactics of adults. The kits will creep up upon one another, pouncing and biting when they have come within springing distance. Also they will chase each other around the room, jumping upon one another's backs and pouncing. In all this Rasy is much rougher and more aggressive than Pansy so that the latter frequently cries plaintively, and has even begun to learn to run away, under these attacks. Even after running away, however, the exuberance of Pansy's spirits, and the instinct to

play, are so strong that he will often turn and race after Rasy and leap upon her, futility (but with pathetic futility) in his turn.

~~already~~
already
repeated

~~Did I mention that I took?~~


Often when Rasy charges at Pansy she gives a little (playful) growling noise. It is hardly a growl, being her soft little "read" with a hint of a growl in it, but it is probably corresponds to one (see p. 48 for later development of this sound; also 83).

Pansy's play consists often, of futile posturings and aimless patting at the air or at large inanimate objects like chair legs; Rasy's is more purposive, being largely (and effectively!) directed at Pansy, although sometimes at hanging strings or at pieces of paper ^{or fragments} which she can tear and crunch upon.

The kids now take their milk cold; also, I have given up the use of the eye dropper.

Rasy's climbing feats grow ever more daring. She now climbs up the 5ft. screen door to

a cross beam at the top of the shack, also up other objects to the vicinity of the ceiling. She has learned, too, to go back down from high places, dragging her claws in a somewhat clumsy fashion, ^{backward and} downwards until she is close enough to the ground to let go. Pansy never climbs anything higher than ones knee.

When I called "liddy - liddy - liddy" this evening (ab. 6 P.M.) the cats were curled up sound asleep. They woke up, raised their heads, listened, then lowered their heads and prepared to sleep again, not being very hungry. Hammer aroused them and they ate. After the meal Pansy kept ~~falling~~ ^{falling} asleep while sitting up . He would

sag first on one side then on the other, catch himself just as he was about to roll over and sit up again, opening his eyes for an instant, then shutting them and commencing to sag once more.

[29] May 23, 1933 . Today Pansy covered up his faces in a careful, purposeful manner, although still scratching somewhat wide of the mark at times. He would paw dirt, then turn around and sniff. If he smelled any uncovered facial material he would scratch gently over it, or partially over it, then sniff once more. He kept pawing dirt - much more than necessary because he often missed the spot - until all was covered up.

Rosy defecated in the sand box today, even though box, basket, and cats were all in a large outdoor (earth bottom) pen.

This evening when I stroked Rosy as she lay on a cross beam near the ceiling she purred - audibly but more faintly than Pansy. Several times last week I thought I heard her purr, but it was always so faint, and so briefly done, that I thought I was mistaken.

Sometimes now, while playing, Rosy bids Pansy's fur as Pansy has been doing to Rosy. Instincts are

emerging.

When I called lally-lally-lally, this evening Pansy came from the other end of the shack and Rosy came hastily down from a high beam.

Rosy urinated voluntarily in the sand box this evening.

Weights: Rosy 754.6 grams (108. m.)

Pansy 539.5

The most feeding, with the resulting constantly distended bellies of the cats, should cause a steady gain from now on.

Toply
Photos
of:

Rosy on stump in woods ✓

Polage of Rosy, 3 aspects ✓

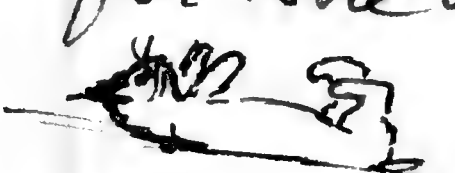
~~Rosy & Pansy in basket~~ did not ^{open} worm out

May 24- Rosy urinated in ^{open} pen, not in sand box. I heard her little uneasy "reaw", which usually announces her needs, but I did not hear it soon enough.

[30]

Rosy started to come to me around a corner of her basket but the milk saucer was directly in her path. She stopped, started forward but drew her foot back before it touched the milk, stopped again. She did

thes again, then, her expectancy being too great, she put her foot into the milk. At this she withdrew it, shook it, took a backward step, went around the milk canner. She is learning, all night; earlier, she always walked through it.

She will throw herself on her back and "fight" (= play) with all four paws and teeth, if one gently tickles her belly. This she enjoys, for she will lie in that position  several seconds after one has stopped the play, inviting a return, and she will resume it as often as the observer will resume the tickling. The posture and actions of the lynx are those of fighting, but Rosy does not bite or scratch enough to hurt during the play, although capable of doing so.

When at all excited, in fact almost all the time when she is not asleep, her always little tail wiggles and twitches like a stubby little worm.

This evening Romy defecated in the sand box, then panned the ventral side of the nest basket, not the sand, twice - 2 scratches close together, then a slight pause and two more close together.

Weights: Romy 792.6 } 9:30 P.M.
Pussy 580.5 }

The kits are, like house cats that I have observed before, blind when locating food, relying almost wholly on the sense of smell. A piece of food directly in front of their eyes will be frantically hunted for by sniffing, and located, at last, only by the side of the nose.

Both kits fattened and pursued a dead mouse about with their paws, but neither made any attempt to eat it - although Romy did carry it about for a while before losing interest. Since the kits have been fed on harringtons and cat food they have quite lost their taste for mice. ^(at this time) Because they are no longer chronically hungry as heretofore, when they were so frantic for

mine.

Rosy defecated in the sand box without having to be taken to it. She panned once or twice at the edge of the box (pan, really), not at the sand, ~~walked~~ ^{stepped} into the faeces, but yanked them immediately, shaking her paws, walked away without having covered them up. Later she washed (licked) the soiled paw.

She scratched her ear and the back of her head at the base of the ear, with vigor and precision.

Refused mine again.

May 25, 1933. Rosy defecated in sand —
 [31] after I noticed her uneasy "new" ^{and had placed further} and her walking about; again failed to cover up faeces.

She lapped up milk out of a dish, not getting it into her nose.

Rosy went voluntarily ^(squealing) to the sand, defecated, but failed to cover up the faeces this time. She panned again ~~at~~ and again, in an aimless fashion, on one side of the faeces, but gave up before she had succeeded in covering them.

6:45 P.M. Rosy went to sand, dug a

shallow hole, then vomited 8 inches away, failed to paw dirt over the spot.

May 26, 1933

[32]

Today we started feeding the hamburger (mixed with Calb Cat Food) boiled, since we have been told that ~~fierce~~ ^{house} cats, when fed on raw meat, get worms, have fits. The cats accepted the slightly cooked meat without comment.

May 27, 1933

[33]

Rory and Pansy both play with pingpong balls on the smooth kitchen floor, batting them here and there with their front paws and then running after. Rory will keep after the ball for 2-4 minutes at a time; Pansy soon stops playing. She hits frequently miss the rolling ball as they follow after it attempting to pat at it, and when it strikes a stationary object and ricochets ^{can} they are nearly always left behind. They would be quite unable to catch a live mouse, unless it were in a confined space, because of this lack of coordination and speed.

About 8 P.M. Rosy gave her characteristic uneasy "meow", commenced pawing in a crevice between two pillars on the bed. Hastily removed to the sand box, she pawed about in the sand, but not long enough in any one place to make a hole, then defecated, made no effort to cover feces up. About 3 minutes later she went voluntarily to the sand box, did not try to dig, urinated, walked away.

Today was very hot, and the kids panted quite hard during their 50 mile auto ride, but when finally put into the shade, at the destination they merely sniffed at water (their first experience with it). Croaked away.

9.7.33 - Rosy - 860.7; Parry 560.4

Photos →

Photos of Rosy lying on her back, playing, in E's lap, also asleep there.

May 28, 1933

[34]

Rosy, this A.M., went to the sand box, "meowed", dug here and there in the sand, but not long enough in any one spot to make a hole, finally dug a deep one (1 1/2").

Further she defecated, but on the edge, then panned about somewhat aimlessly, sniffing at the spot. She succeeded in covering the faeces about half up.

[36] May 30, 1933 Rasy's impulse to lick fur and furry objects is not confined to her own fur, or to that of Pansy. She licked E's silk pyjamas, also a cotton-and-wool sock of mine which was lying on the floor.

She can now scratch her head vigorously and with precision.

Today she dug a hole in the sand box, defecated, covered the faeces nearly completely.

[37] May 31 - Rasy's play is gradually becoming more violent. She tugs and bites loose pieces of cloth, and ones fingers, too. If one does not leave the fingers more than a moment in her mouth one is not hurt, but if she gets them between her caninials she bites painfully. Pansy yelps almost continually when Rasy plays with him now, but he

makes only a feeble effort to escape, usually, and often merely sits and takes the punishment with no resistance other than the yelping. Rosy races and leaps about the room, ^{sometimes} chasing Pansy, sometimes chasing nothing in particular; the floor thuds with the noise of her bounding feet. After she prefaces her charges with a little (mock) growl.

Her markings are becoming more prominent - longitudinal parallel dorsal stripes especially.

Weights (ab. 1 P.M.). Rosy 917.8
Pansy 562.8.

Rosy now laps up milk freely, taking it more rapidly and noisily than Pansy, but less often.

This evening I stopped on Rosy accidentally, she gave a sharp, hoarse, growl, quite startling in its effect, and retreated several feet; however she bore no malice, and permitted herself to be stroked immediately afterward. She likes to be

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handled when she does not have something else (as some definite goal or objective) "on her mind". If she has such a goal, she squirms, backs away, and can be induced to forget her objective only with difficulty.

9:05 P.M. R. S. watched a shallow hole in the sand box, turned around aimlessly many times, finally defeated away from the hole, made one or two futile pawing motions near by, and left without covering faeces.

~~May 31 - Photos taken of the cats playing together, Patsy mostly in the role of the victim. None of these turned out~~

June 2, 1933. Patsy will lie on her back ^{at} and paw with her front feet ~~at~~ one of her hind feet, catching hold of it and biting it, when nothing else is present to play with.

About April 15th I received from Chas. H. Edmondson, trapper for Gordon H. True, Jr., two Bobcat skins. Taken at State Quail Refuges in Southern

California, as follows:

① ♀ - taken Feb 8, 1933 at ^{city} City Ranch Quail Refuge, 3 1/2 mi. w. of Palmdale. Contained fur of a rabbit - species not yet determined.

② ^{see catelium 111} Sex. ^{contents for this} taken Jan 25, 1933 at Indian Springs Quail Refuge, 4 mi. w. of Palmdale. Contained remains of a jack rabbit, plus some earth probably ingested accidentally.

Rosy goes into dark corners, often high up on shelves to sleep whenever possible, probably showing an instinctive choice of location.

Pansy (and other cats I have observed) is content to sleep on the floor or in other low places, light not being distasteful either.

June 4, 1933. Today we got one of McTellan's 141 alley cats, age about that of Pansy, as an additional playmate for Rosy. During the last week, under Rosy's constant rough, biting, painful play Pansy, never good at defense tactics, grew steadily thinner and weaker, finally lost his appetite

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and became so sick and weak even to run away. We had to keep him in a separate room, away from Rosy, to prevent death from ensuing.

The newcomer was heavier than Pansy and more self sufficient, also quicker and more aggressive. Confronted with Rosy it snuffed at the latter gingerly and would probably have done nothing more, being somewhat shy at being in a strange place (Oakland). At this juncture, however, Rosy, not at all shy with the stranger (a ♂), leaped upon him and bit and clawed him as she had always done with Pansy. Frightened, the new cat (Polly) growled, spat, and stopped at Rosy's head. Rosy backed off, shook her head, changed good naturedly once again, received the same treatment. This continued for ten or more minutes. Rosy never seemed scared or angered but she was cautious in her attacks. Finally we separated them to avoid

making the new cat. (hitherto
having been raised in a barn)
~~from being~~ too wild.

June 5, 1933. Rasy and the new cat sometimes
[42] play, but often "fight" as last night.
The new cat (Polly) fights more
vigorous than Rasy in self defense
but is no match for the cheerful,
tireless, hard-biting Rasy, and is
usually under neath. Whenever Polly
(a ♂!) really gets bitten hard however,
he stops playing, growls, spits,
and slaps, holding Rasy at bay
with partial, but not complete
success.

Polly uses the sand box every
time even though raised in a barn
with a dirt floor, previously - thus
does instinct work. Rasy defeated
and failed to cover as usual. Polly
digs deep holes every time.

Polly and Rasy play without
hunting each other, behave like two
kittens that had always been
raised together. Polly's play resembles
Rasy's although more vigorous,
in that it consists of biting and



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patting, at large inanimate objects, ~~and~~ posturing, and hitting at the air.

Polly eats milk, eats cat food, readily and in large amounts. Pansy has eaten tremendously and gained much weight since being separated (except for short intervals) from Rasy. Rasy plays tirelessly, mowing after each kitten and mauling it until it cries in pain (or growls in the case of Polly), then ~~chases~~, when the two kittens have been removed, chasing ~~its~~ ^{her} own tail, or a ping pong ball, or racing after nothing at all, or wrestling with ones hands - and biting painfully. When the kittens have been removed Rasy "rows" incessantly ~~and~~ sniffs and scratches at the edge of the door leading to their room, bawls upon them with evident eagerness when finally admitted to their part of the house.

All three kits enjoy having

their fur (back, belly, sides, head, feet) is ~~being~~ smoothed with a hair brush. The brush duplicates in some measure the action of a mother cat washing them. They lie quiet while it is going on - usually, Rosy sometimes being an exception and hitting at the brush or else trying to run away altogether (in order to play with the other cats).


June 6, 1933 [43] Rosy covered up faces today. Part of the time she does this but part of the time she does not; part of the time, too, she goes under the low parlor sofa, as I discovered today! The other kittens, older, seem to behave themselves in this regard.

I forgot to record the kits' weights for June 2 :
 Parry - 562.9
 Rosy - 1003.3

June 8, 1933 [45] Tonight I brought in a full grown (ab. 12 lb.) alley tom cat, a pet of some neighbors. He commenced

to eat from the kittens' food dish when suddenly Rosy came into the room. Rosy stared and walked slowly but alertly up to the tom cat. When she was a few inches away he crouched and spat at her. This caused her to halt momentarily, but in a moment she advanced again, giving a curious little eager "mrow", evidently eager to play with the strange large animal and not at all daunted by the cool reception. This time the tom cat growled, spat, and slapped quickly at Rosy's face. Rosy braining back her head just enough to avoid the blow, but not retreating a single step. The tom cat returned to his eating and Rosy began to walk around the big cat, standing and walking on her very tip toes, with her tail held stiffly down, looking very wary and bob-cat like, and giving her curious little eager "mrow". Finally she got behind the tom cat, and unable to remain wary any longer, pounced upon its tail. Instantly he turned

and struck, growling and spitting, and simultaneously Rosy ducked her head and threw herself upon her back, all four feet raised in defense, apparently instinctively. The tom cat returned to his feeding, whereupon Rosy rolled over onto her feet, paced back and forth still muzzling, "stalked" the tom cat from behind chair legs, but held off from an actual encounter for some time. At length, again losing caution, she got too near, received more slaps, threw herself on her back as before.

[46] June 9, 1933. Brought the old tom cat in today. Same process as before. After awhile Rosy seemed to grow tired of her ineffectual attempts at play, always rebuffed, and crawled down, merely watching. Not so Bincy; he stood his ground, ^{on top of} fur, erect like a bottle brush tail ~~having~~ hanging thus: , and growled at regular intervals. Manifestly frightened, as one could see by his

trembling, he yet was completely transformed from his ordinary over-doxile self. Part of the time evidently frightened to the point of near-confusion, he growled also at Polly who was standing near by in a similar petrified hostile burst, attitude, and Polly returned the remarks. Polly quickly slipped away from the scene altogether, however. Razy, who rubbed up against Pansy several times (as ^{Polly} it also rubbed up against furniture) in ~~its~~ her eagerness to play with the big tom cat, received from Pansy no growls or other hostile signs, familiarity evidently preventing such a manifestation even in Pansy's scared, confused state.

Tonight Razy spat feebly and made little ^{feint} grunting growls when we stirred about in her feed dish with a fork, or brought our hands near her head, while she was feeding. The sounds ceased when after I had stroked

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for several times, however. For three or four days before this, I have thought as true that I heard faint hissing noises from Rosy under these conditions, but never could be sure before.

To night I put my hand into the hole inside the sofa where Rosy was asleep. Evidently I startled her, for she spit at me. I talked to her and thrust my hand in again, requiring no more hostile demonstrations.

June 9, 1933^(cont) - Weights (ab. 6 P.M. after a heavy meal) :

Rosy 1257.2


Parley 757.3 (Parley has been sick, is only just coming to gain weight)

Polly 1032.4

Rosy has something the matter with her ears, keeps shaking her head and scratching them, at intervals all day long.

Rosy is still gaining (see above), but is noticeably thinner (one can feel her vertebrae and ribs more easily), this thinness possibly being correlated

with her increasing exercise. She races and gallops about, rolling the other kittens about and biting them, and keeping "on the go" a large part of the time. She usually goes to sleep during the early afternoon hours, awakening, to race about and play, ~~for~~ anytime from 3 P.M. to 4:30 P.M. In the evening, from about 9 P.M. on, she usually sleeps also, and seems to remain inactive during the entire night. Even in the morning as late as 9 A.M. I often find her asleep in her basket when I come to let her out of her sleeping cage. Of course, she ~~may~~ become active earlier in the morning and then go to sleep again. The other kittens are kept in another part of the house at night.

Rosy has two notches, one on each side, on the antero-lateral margin of her tongue.  It hardly seems probable that these should have been caused by her biting herself. House cats (*F. domesticus*) do not have these notches.

June 10. Rosy has now learned to use
 [47] the sand box every time. Yesterday
 and today she spent a large part of
 her time in the auto (sedans), since
 we were on a trip. She knew enough
 every time to go to ~~the~~ her basket, which
 always contains the sand box.

There seems to be a definite association
 in kittens between the stimulus of
 sand (whether the sight or the feel of it
 I don't know), or perhaps the odors
 emanating from excretions buried
 in it, and the act of excreting.

Both yesterday and today after Rosy
 had finished, we put the other two
 kittens into the box one after
 another and each, after sniffing
 attentively at spots ~~left~~ or buried
 faeces, left by its predecessor, began
 in its turn to ~~be~~ dig a hole, use
 it, and then cover it up. In this
 way, on both days, all three kits
 used the box in rapid succession. (Sept. 10, 1933. This is now the usual thing.)
 Once when Pally ^{had} partially uncovered
 previous faeces while digging, he
 covered up his own and then the
 others also. The kits always use their

noises rather than their eyes, as guides during the hunting process. Rosy now covers up her faces practically every time.

Given a mouse, Rosy toyed with it, ran away with it whenever anyone approached, hissed (or rather "snorted") whenever I tried to take it from her, but would not eat it, soon forgot it. Same with Pally's except that he did not show as much interest, did not hiss. Parsy, however, growled, ran away with it, finally ate the head and thorax. I gave the rest to Rosy once more. She ate a little, played with the rest, finally discarded it.

Rosy has gained ^{much} more strength, but only slightly more ~~strength~~ agility during recent weeks. She still falls from places that are slippery and still misjudges distances when leaping through the air, but her greater strength ^{in holding on, and in leaping} (rather than greater agility) renders her falls less frequent.

The cats drink quite a lot of milk during this hot weather, requiring the

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filling of the saucer two and three times per day. Riding in the car invariably makes the cats sleepy after the first 20 minutes or so. For the remainder of the trip (50 miles ^{to camp Ranch}) they close and sleep.

Sometimes, when ^{still} held after she has become tired of being held and has become fidgety, Ray will not only struggle and squirm but will utter a faint, inarticulate growl - although not trying to bite or employ any other hostile measures. ^{Sept. 10, 1933 - These growls, now louder, and the period of tolerating shorter, so that she is obliged to put her down quickly.}

June 13 - We took her to the veterinarians [50] to have her ears cleaned out, since she has been shaking her head and scratching her ears for days. She ^{was} held ~~unusually~~ ^{firmly} ~~still~~ tightly by an assistant during the process, but did not attempt to struggle even so, her chief motion being a reflexive scratching with the hind foot of whichever side was repairing the ear-cleaning treat. A considerable quantity of dirt



and wax was removed with cotton swabs ^{wound} on the end of a pair of scissors.

June 16, 1933 [53] Racy and Polly have been drinking water during the last two days because there has been no fresh milk, and neither of them, unlike Pansy (who liked it) would drink ~~fresh~~ condensed milk.

June 18 [55] When ~~she~~ calls to Racy from across the room, in the manner that she uses when holding Racy in her arms, Racy, if not pre-occupied with other play, will sometimes lie over on her side and stretch out in the play attitude, like a dog under similar circumstances, ^{showing recog-} ^{nition of the call.}

Pansy growled today over an ~~egg~~ egg shell just as over a mouse, why, unless the smell was stimulating, I don't know.

Racy still spits, faintly, when another cat comes near it while it is eating raw meat. Cooked food does not call forth this reaction.

Rosy is becoming increasingly curious about her surroundings. Yesterday she prowled about the house for several hours, looking up at furniture and objects above her reach, and giving the little "reow" call continually. When E. lifted her up she would sniff and investigate eagerly her new surroundings, wander about there for a few moments, then commence to ~~wander~~ cry to be taken to a new place. This continued for most of the afternoon.

Later in the day, still curious, she stood upon the tip toes of her hind legs and peered into the toilet bowl intently. Her curiosity still unsatisfied, she climbed up onto the edge, slipped with her usual clumsiness, and fell in. Of course she was out immediately, shaking her wet feet and evidently quite uncomfortable.

She got much excited when she saw some sparrows through

the window, staring intently with
 eyes held low and nose held
 high; same with quail which
 she saw later. At such times
 her tail, ^{by some} seldom still, twitches
 spasmodically and with more than
 usual rapidity, from side to side:
 flick-flick-flick; flick-flick-flick-flick;
 flick-flick; etc.

June 19th - Rosy comes near the toilet
 [56] and stares at it, but manifests
 hesitation at approaching too
 close, shaming that she remembered
 yesterday's experience. She showed
 similar shyness at a small
 tin pail, looking at it from
 a distance, on top of, although
 Pansy, not so inhibited, did
 not hesitate to lean off over the
 edge of it. Rosy eventually came
 and looked with her paws over
 the edge, too. She finally came
 to look over the edge of the
 toilet, too, and walk upon the
 edge, but she has not
 fallen in any more.
 Gave her a wood rat (full

grown, dead) today. At first with characteristic cat blindness, she only smelled the rat, did not see it, and grabbed at it with her mouth. When I laid it down on the floor, however, she would no longer come near it, but instead kept running around it, on her tiptoes, as she does with the tom cat. Pansy was frightened at the object too, arching his back and growling as he did at the tom-cat. Presently they both got over their scare, Pansy going off, Rosey commencing to play. Rosey would spring into the air, all four feet off the ground, front feet spread-eagled, and



come down on top of, or straddling the rat. Presently she too lost interest and left. A baby Marmoset blind, squirming and squeaking, was now given to Rosey. She seized it and ran all about

the mouse with it pursued by Pansy. She would drop it and push it about but quickly forget it. Pansy, when we gave it to him, growled, did the same with the mouse as Pansy. They are not yet old enough to kill mice, evidently.

June 19, 1933

[56] Wz jabs - Rory 1450.1

9:20 a.m.

Polly 1214.2

Not after a heavy meal

Pansy 989.9

June 20, 1933 Rory will not take Khris

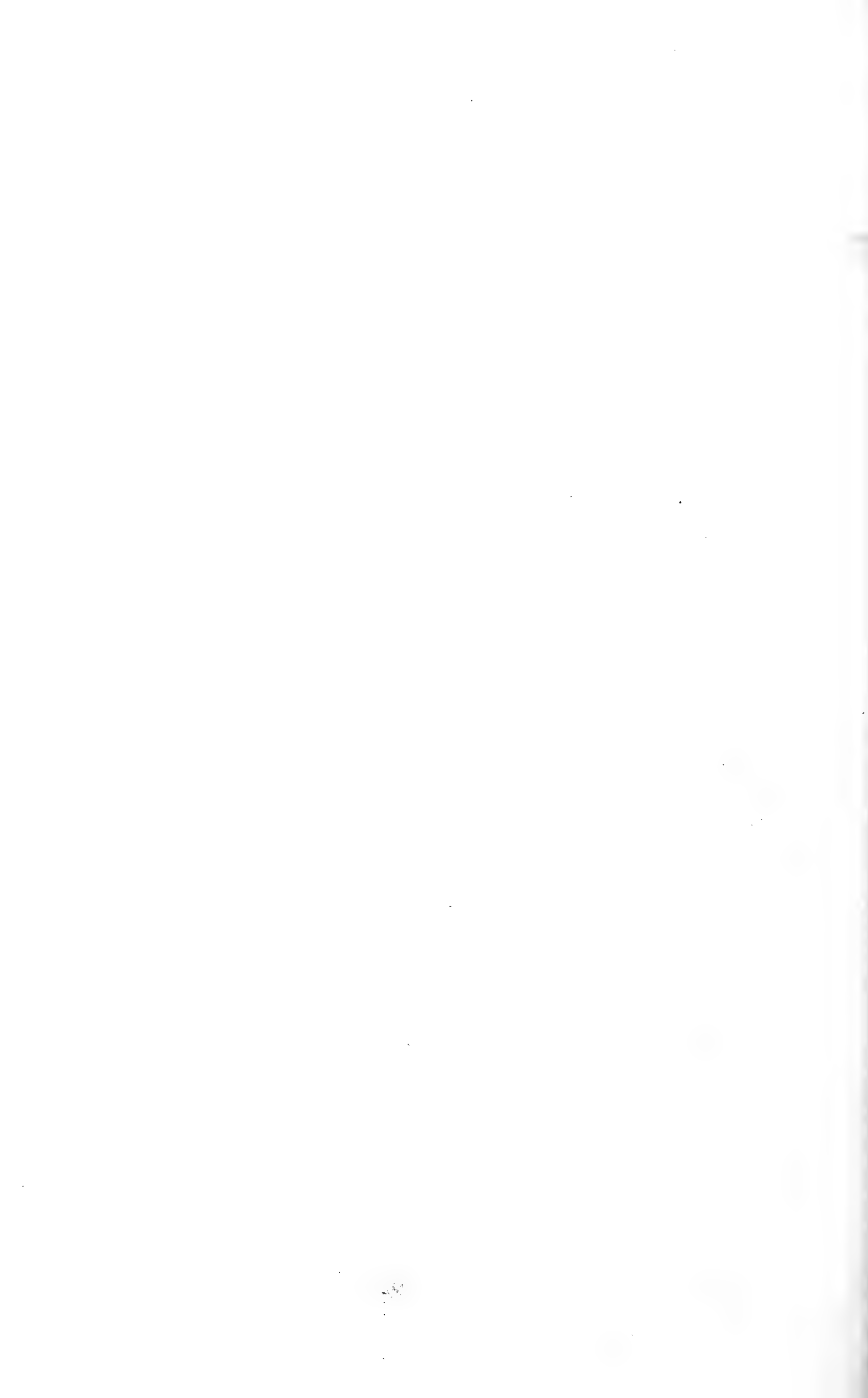
[57] (powdered milk) although the other cats like it; she drinks water instead.

The faint growls, which we have heard at times when we have held Rory against her will, became louder and took on a faintly snarling tone tonight when we held her tightly and repeatedly squirted salt solution into her eye to wash it out. As soon as released she forgot the incident, apparently, for she ate and played with us as usual (see also p. 62).

[58] June 21, 1933 Rory drank a large quantity of khris this morning.

A mouse, when given to Pansy, called forth the same reactions as usual - growlings and crouching, then pattering and posturing, then it lost it to Rosy, who did as she always does - simply played with it. Rosy presently dropped it, whereupon Pansy purred and growled and behaved as before. The lack of desire to eat mice now even though the desire was shown earlier (see antea) seems explainable on the assumption that the mild diet of those earlier days engendered an inordinant desire for meat.

Rosy got it again; when chased by Pansy and Polly, also eager for the mouse, Rosy growled and spat and finally even snarled at Pansy. With typical cat blindness, however, Rosy lost contact with the mouse, sniffed everywhere but failed to see it 4" away, and Pansy got it again. At this Rosy saw it, but merely crouched, watching eagerly; did not attempt to take it away from Pansy. I gave the mouse to Polly. Polly



growled and spat, stopped at Rosy when Rosy tried to approach. Rosy keeps at a distance when the other cats spit and growl, possibly because of her experience with the torpent (see ante).

Rosy finally snatched the mouse from Paddy, growled and growled at every bit that came near, but not until the blood flowed ^(see page 28 also "footnote") finally after interminable playing ate the mouse up, resumed its usual good nature.

Rosy refuses sandhines, eats cat food. She has never shown great liking for salmon, eel or tuna.

June 19-21 Rosy has had ^{same} (19-21) some sort of irritation or infection of her right eye. In the morning, especially the 19th, the eye was half covered with yellowish matter. It easily rubbed off, the eye appeared quite normal and the cat was as lively and exuberant as usual. However, the matter emanated from the lower, inner corner of the eye.



On the 20th the affection was

less (we squeezed their eye 2-3 times each day with warm salt water), and on the 21st less still. Ethel says that babies (human) commonly get ites and infections similar to that of Rasy's, with no ill or trouble - same consequences.

June 23. Rasy's eye nearly, but not quite well; a slight dried secretion noticeable on the edge of the eye at the inner corner.

June 25 - I put a full grown wood rat [62] into the cats' large cage today.

Whenever it scurried away in search of a hiding place, Polly and Rasy, but particularly Rasy, would race after it - and stop up short staring attentively, ^{and sometimes} whenever the rat would stop. The bewildered rat would often reverse its course and blunder right in among the cats, whereupon they - curious but timid (even Rasy!) - would back up or leap away altogether, only to give chase again as soon as the rat ran away once more. As always, whenever the rat

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was able to elude their gaze - which he often did - the cats pruned unable to follow him and merely sniffed eagerly but aimlessly at the spot ~~where~~ which ^{he} had just vacated, even though he might be crouching a few feet away behind a box. Eventually they ^{usually} would locate him by wandering about sniffing.

June 26 - The wood rat all night in the [63] cage with the cats is unharmed.

Polly and Rosy had a real fight over a mouse (apparently), today as seen by E. Polly had the mouse, spat, growled and clawed at Rosy when Rosy came after it. Rosy kept right on coming through the flappings and clawings, grabbed the mouse, pulled it away from Polly, and made off. Five minutes later E. suddenly saw the fight (the whereabouts of the mouse was at that time unknown). When she first caught sight of them, both cats were in a tight embrace and rolling over and over biting each other with an earnestness not usually

seen, Polly growling and yelling, Roy growling too - a thing she has never done in play. Presently Polly broke away and moved to the far side of the pen where he crouched down, eyes dilated, evidently fear-stricken. Roy, instead of racing after as she usually does in play, stood ~~high~~ upon her tiptoes and slowly walked over to Polly as though stalking him with full intent. When she was close enough to touch him she suddenly made a quick grab and got hold of him by the neck just behind the ear. At this they rolled over and over again, Polly yelling. Ethel interfered at this point, pushing them suddenly apart; they sprang away, eyes dilated, and then walked off. The fight was over.

June 28, 1933. Roy is always independent
[64] and head-strong, as I have ~~probably~~ emphasized before. If she does not want to be picked up or petted, she squirms to get away, and if not released forthwith commences to

struggle and snarl and growl faintly. The only time when one may be pretty sure that she will suffer herself to be petted is when she is sleepy, as after a full meal. Unlike the other cats, which may be petted at any time, she tolerates no petting when she is romping about actively; when picked up at such times she is always in a perfect frenzy to lie off, often growls to enforce her demand, does not bite, however.

June 28 - Weights: Rasy 1643.7
 [65] Polly 1509.4
 Pansy 1130.2

June 29, 1933 - The wood rat is still [66] unharmed, although Rasy continues to chase him whenever he runs away and pesters him when he is hiding in cracks and corners. As a result, he is out in broad daylight very often. He has learned to rear up upon his hind legs, and exposes his teeth to the cats when hand pressed, and this always causes them to stop and draw back.

June 30 - Rasy's eyes (both) were stuck [67]

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together both this morning and yesterday morning so that she could only partly open them when she first got up (about 6 AM). A few minutes after she had got up they became unstuck, although with a gummy deposit (slight) on the edges. No more trouble during the day with them.

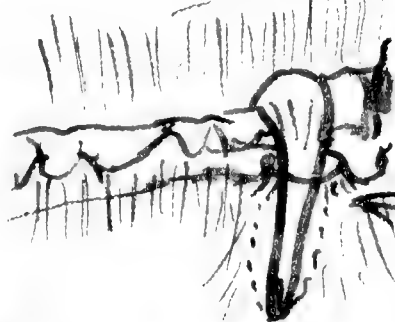
July 1, 1933. Unlike the house cats, Rosy has two pits of considerable depth which act as sheaths for her upper canines. The lower canines are relatively shorter than the uppers and have no such pits. Neither upper nor lowers of the other two cats have the sheaths the upper canines simply sliding past the gums of the lower jaw.

House cats



Side View

Rosy



caniniferous pit

Top view



the caniniferous pit.

Each pit terminates as a furin disc,

raised about 1mm from the surrounding gum tissue. The pits are partly filled with food particles.

Rosy's tests are very small:

① ← boundary where hair stops

test (height ab. 1mm). They are in fact, hardly larger than those of the ♂ house cat Polly.

July 2, 1933 Rosy ate two fence lizards [69] (Sceloporus), all except the tails. At first none of the three kittens paid much attention to them, but presently Rosy began to play with one and Polly the other, Polly chewing and eating the insides of his. When Rosy saw Polly eating his lizard, Rosy left her own and took Polly's away in spite of the growling and spitting of the latter. She ate all of it but the tail. When given her own lizard again (which she had not chewed enough to break the skin and so had not realized was edible, apparently) she immediately ate it also, and after it was gone I sniffed about the spot in search of any left-over fragments, as cats and others

commissioners (I think) usually do. About a week ago I gave the kittens a 24" king snake with the head chopped off. They sniffed the bloody end but did not eat of it. On the other hand they showed no fear of it, but wrestled with it and bit it as they do with other dead animals. Percy, as usual less aggressive, did not play with the snake, ate no lizards.

July 3, 1933. Rasy is at least as intelligent as the other two kittens and perhaps more so. During the last week we have been calling out "Rasy!" in harsh tones, and sometimes accompanying this with a gentle slap, whenever she climbs up onto the table. She has always hurriedly departed when we did this, and now it is noticeable that even when hungry or curious she stops short at the edge of the table - or when she does let desire overcome caution, she retreats at the sound of our voices. Today she started to climb onto the table and stopped!

short at the sound of Ethel's voice.

Being hungry, however, she did not retreat, but kept raising her foot to advance. At every attempt to advance however, E. would call out to her sharply, and at this she would give a little growl and check her advance. [See p. 87]

July 4, 1933. Given a whole ^{full-grown} gopher, Polly VI ~~gopher~~ snatched it away, growled at kittens and at me, when approached, started to eat the gopher without any preliminary playing (she was very hungry), kept at it until the entire animal was eaten.

In the afternoon I gave her a live wing-clipped brown towhee. She and Polly chased it eagerly all about the cage, both cats grabbing it and holding it for a moment only to lose it again, requiring another chase. This alternate chasing capturing and losing of the bird lasted at least 10 minutes and shows that the kittens would probably catch few birds (or other animals) if turned loose to live on their own (the losing of the prey seemed more accidental than playful). At last

2.17

the bird died from the rough treatment and after the kittens (chiefly Rosy) had played with it awhile, they left it. Birds have to be denuded of most of their feathers before the kits will eat them.

When Rosy plays with a mouse or bird she not only bats it this way and that and leaps up into the air to come down straddling it, but in addition she frequently holds it in her mouth and then with an upward jerk of the head releases it so that the prey is tossed several feet through the air - at which Rosy pounces after it and gorges it as it hits the ground. The house cats have not been seen to do this.

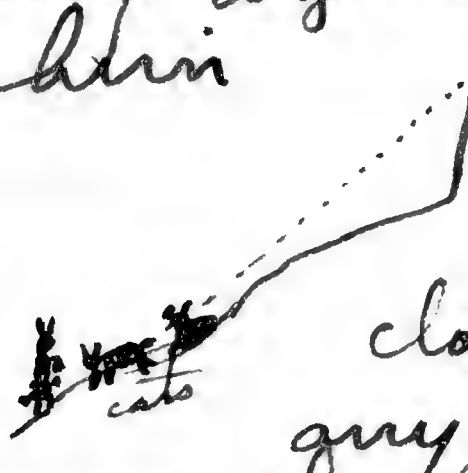
I had to take ^{suggest} the woodrat which was in with the kits for several days (see entry). They never hunt him, and he had succeeded in building himself a retreat of sticks and straw so that he was inaccessible to them.

July 10, 1933. Rosy played with, then tore apart and ate a $\frac{2}{3}$ grown dead brush rabbit. I had already made

a small incision in its abdominal wall, however, which served as a point of attack when she came to eat the rabbit. By July 11 she had eaten most of the ~~thorax~~ ^{thorax}, all of the viscera, and torn the legs off of it.

July 11, 1933. Racy ascends to and perches 78 on slender dead branches less than 1" in diameter (sparrow-hawk perches); the other hits never.

July 20, 1933. A Mr. Alfred D. Buckman 87 owner of a Standard Oil Station at Menlo Park, told me that once about a year ago he was standing on the top of a steep hill overlooking a brush-covered slope when he saw three full grown bobcats out hunting together. They could not see him

 and they watched gradually up the slope, keeping close together, not getting any game however

during the time that he watched them. When they got within range he opened fire with his shot gun - shot two in succession.

while they stood staring at him in surprise, then wounded the third, which he afterwards killed before it could get away with a fourth shot.

Took Rory and the other cats to the Moss Beach Summer School Cal. The others showed no alarm when put in the large laboratory room with 20 students, but Rory was nervous, moving down and slinking about under benches and between people's legs, and refusing to play. Later, once at Castle's cottage, where she had been there several hours and was used to the place, she played with the other cats and allowed herself to be handled, in the presence of about 8 people with nearly her usual lack of timidity.

July 23 Rory, for all her strength and [90] potential ferocity is still backward in attacking live prey if it puts up any resistance.
A ♀ *Peromyscus m. gambelii*

(with young recently taken from her) which had been holdled so that it could not escape, squeaked, opposed its teeth to Rosy's attacks, and held Rosy off for several minutes - long enough to have escaped under natural conditions. Lucie, at least, it hit Rosy, hanging on, in one case, to her paw so that she growled and tried to scratch her paw away, dragging the mouse with her in her efforts. At length the mouse died as a result of rough treatment, at which Rosy batted it about with her paws, finally lost all interest in it and allowed the other cats to play with it. Half an hour later one of the other kittens was eating it.

Did I mention, about 3 weeks ago, that Rosy, for some reason unknown to me, no longer uses her claws either in play - ing with us or when climbing up into our laps or onto our shoulders, her claws being sheathed

Why she should be so careful I do not know, as we have not tried to break her of the (admittedly painful) habit of digging her claws into us for a foothold. Only when she is on our shoulders and in danger of losing her balance does she ever use her claws, and these occasions are rare (but see below).

Pansy and Polly each have 4-5 missing incisors (both upper and lower gums), and Pansy's canines seem to be slightly loose. Rosy, younger, has lost none of her milk teeth yet.

July 24, 1933 Rosy (and the others also) eats
 [IV] shredded wheat biscuit with creamed tuna on it. She usually shows little liking for artificial foods like this. Variety pleases her better than a steady diet of any one thing (except wild game, and probably hamburger). She will not eat hardboiled egg, although Pansy does so eagerly.

Regarding note at the top of the page, perhaps the increased gentleness of Rosy is a behavior change

characteristic of all young predatory mammals. If they did not become less rough as they became older and stronger, they would probably kill one another. The play of dogs, which growl and bite one's hands yet without injuring them, illustrates this.

I suppose I have mentioned Rosy's little "barling" "gruff!" which (for the last two months) she gives when pouncing (in play) upon the other cats or upon us. [40-52 pp 38, 48]

Horses do not scare the cats. Rocky (Gloria Jane Rupp) did scare Rosy, so that he spat and erected his fur, but not so Rosy.

July 29, 1933. Rosy was startled by my sudden appearance in front of her ^{With a hoarse growl} from behind some obstruction. She fell ~~from~~ ^{from} her perch on a branch four feet above ground, landed on the ground facing me with all four legs spread, ears laid back, fur erect. When I spoke, and thrust my finger through the wires she regained her normal manner, however.

August 4, 1933 Took Rosy and the other kits

to the Bensons' house, where she is to stay during our '3 weeks' trip to the east. Bensons have a Persian ad ♀ (named Simba, ~~the~~ mother of Pansy), which has a small (2-3 weeks) kitten. Simba spat and hissed at Rosy and the other cats when they were introduced; ^{they} acted just as ^{they} had the lonest was brought in among them (vide ante). The two house cat kittens removed themselves discreetly, Rosy, on the other hand, wanted to play - but was sufficiently impressed by Simba's bottle brush demeanor and hostile sounds to keep just out of reach.

August 27, 1933 - We arrive back from
 [125] East, call for kittens at Bensons.

Benson tells me the following:

1. Rosy escaped 3 times from their house, taking every momentary opportunity to sneak out of slightly open windows or doors slightly open. Once outside (whether she may have been led by curiosity), she became, like my girls (see MS, published rept. soon), a "startled shrinking, furtive creature".

The first time she got out she was only out for a few minutes and followed about after Simba on the lawn, was lured within reach by means of raw meat, only bit a little when picked up and brought inside.

2. The second time she was out for a longer time, ran about between Benson's house and one next door, finally, upon being pursued by Benson, took refuge under the neighbor's house. Benson got hold of her once but had to drop her, because she scratched and bit so hard (he has a deep gause in one thumb especially, not entirely healed after 10 days or more). Finally, with the help of the neighbors, he succeeded in catching her again and got her inside of the house.

3. The third time (this morning, it was) she got out through a partly opened window, at the very top, during the night ^{early morn} and was not discovered until this

morning at about 7:30. At that time she was walking down the sidewalk between the Benson house and neighbors, fled into the shrubbery of the neighbor's yard when pursued by Benson in pajamas. After a very considerable search Benson found her, on his second investigation of the place, in a small unused dog-house. He was obliged to nail up the entrance, transport cat, ~~to~~ house and all into the house before liberating her. Once inside, like my oaks she resumed her customary docility.

*One other circumstance which, Benson said, upset her usual docility, was the feeding of raw meat, or of chipmunks. At such times she growled, greedily made off with her booty when approached, acted the same as earlier with mice (vide notes, alp. Co. Rapt.). With us she sometimes acts this way over hamburgers, sometimes not, probably always would over

bird or mammal bodies, how-
 ever. ^[Sept. 20, 1933 - with wild game, as woodrats, etc.] is dangerous to approach closely at ^{instants} times.

5. As always, she minds when told to jump down from a table or other forbidden place, and as always, she gives a little throaty faint growl of protest even though obeying. [The command is "No! Rary! No!" See page 77]

6. The attribute which E. has called "jealousy", and which I believe I have mentioned earlier, although without being able to offer an interpretation, was noticed ~~for~~ regularly by Benson too. The same behavior is always shown by Rary at such times. Although usually she does not show any desire to be picked up and held (usually struggling away from ones grasp, in fact, if one tries to pick her up), yet if any of us picks up and caresses some other cat, holding it and talking to it, Rary (if not pre-occupied with some other activity) will come bounding

onto one's lap, clinging all over one's arms and shoulders, and attempt to get at the other cat. Even when repeatedly held off at a distance, or when pushed away, she will persist in her attempts to reach the other cat, climbing under one's arms, or reaching under them with her paws, or else clinging bodily over one. Just what her motive in all this is I do not know. She does not really seem to be seeking to divert the caresses and attention to herself; neither does she show any hostility toward the favored cat. In stead she merely seeks to hup and wrestle with it in her usual playful manner, but with more than usual persistence.

7. Although she has within recent weeks been noticeably less rough in her play than at first, she is now getting

rough again. Benson says that frequently she makes the other cats run out in fear when she plays with them, and that at such times they usually run away and crouch motionless somewhere more or less out of sight, so as not to attract her attention. When she has meat and growls at them to keep away they are obviously afraid of her.

8. Bensons are going to keep Barney and in his place have got for Rasy a small (4 months old?)alley cat known as "Shoes". Benson said that at first Shoes was so afraid of Rasy that he involuntarily defecated, soon however he became used to her, now he sleeps by her side, or in her arms, runs away only when Rasy plays too roughly. ~~Barney~~

The great individual variation exhibited by cats, is well shown by the dispositions of ours, as follows:

1. Parry - Exceedingly affectionate, not at all aggressive (but surprisingly defiant occasionally, when confronted by tomcat-see ante), physically weak, slow, ineffectual in play activities, bristling when in human company (i.e. not easily frightened at such times).

When Parry is not around he shows much more liveliness, playing fairly actively, although with ineffective pattering and posturing instead of purposeful leaps and stalking tactics as does Rosey. When Rosey is present he tends to keep still and thus avoid attracting her ^{or quite} attention.

2. Polly - Almost as timid as Parry, not affectionate (usually running away when cornered and petted), not defiant even to tomcats (see ante), physically

strong and handy (showing the superiority of Valley-cat blood over mixed, pedigreed, Persian stock in this respect), fast, effective in play activities (chasing and seizing objects). When danger threatens he generally sneaks away in a most self-effacing manner.

3. Shoes - Affectionate as Pansy, physically as efficient as Polly. Unlike any of the other kittens he has a marked tendency to whine and cry for food and attention. None of the others, not even Pansy, have shown this "spoiled" behavior.

4. Pansy - Non-affectionate (passively affectionate only when sleepy), ramunctiously aggressive, physically formidable, not infrequently irritable (growls when picked up against her will, when

Lynx rufus

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told to get down from tables),
nevertheless tractable, given
to occasional alarms (as
when in presence of strangers
or when in strange
also in presence of Radio noises, especially static
surroundings), fearless toward
other animals, tenacious
of purpose (it is difficult
to make her stop doing
something by trying to distract
her), moderately good natured.
About Aug. 20¹¹ - Benson weighed the
cats on a not-too-sensitive
scales:

Pansy	-	4.75 lbs.
Polly		5.50 lbs.
Pacy		7.00 lbs.
Sumibald Benson, mother of Pansy		7.50 lbs.

[Aug 27 (cont.)]

Taken home, Pacy showed no
loss of memory as to place, galloped
about through the furniture, and
from room to room, as usual.
When scratched around the
shoulders, also when given
hamburger, she purred,

roughly and briefly.

She has all new upper incisors, also canines (so does Pally); both she and Pally still have their baby canines. At Reno we saw a kitten about Pally's size which was getting the 2nd set of canines. The new teeth were coming right on past the old, in at least one case.



^{new;}
(only the tip
emerged as yet)

canines ~~are~~ of course ^{will be} much larger than the first set.

Polly constantly avoids fire, although never running from a fire; the hot air she has only to sniff to cause her to back away.

Polly never gets excited at reflections of herself in the mirror, probably because her nose does not corroborate what her eyes tell her (Alfred Payson Lockman ^{has} ^{written} says this is true of dogs, also). However, today, while playing with a piece of paper which

Ethel held above her head, she caught sight of its reflection in a mirror lying face upward on the bed, made passes at the reflection.

Occasionally, when Rony becomes too rough, the other kittens (especially little newcomer, Shae) ~~him~~ turn and hiss at her. Often this has an effect, probably because Rony has been daunted by similarly behaving ~~for~~ adult cats (~~such as~~ neighbours Cat, Simba) so many times.

She is indeed rougher than formerly, as Benson has said. Our hands often are lacerated by her claws when she plays. If we say "Now Rony!" (in same tone, as when warning her to get down from table), however, she becomes less rough, at least momentarily.

August 31. Rony can discriminate between situations where in she is liable to be punished and situations where in she is not:

Rosy, unmoved, was in the sink, a forbidden place. When Ethel chanced to scold one of the other kittens for something, Rosy growled, jumped down. Shortly after this E. again scolded one of the others; Rosy, ^{sitting on a chair} right beside E. was not in a forbidden place, listened to the scolding without reacting at all.

Rosy's fur is now becoming redder, due to the appearance of new, reddish gray hairs - mostly, so far, in the shoulder region.

Rosy licks herself much less frequently than the other cats do themselves. ^{Only occasional} ~~very rare~~ with her, too, is the habit (usual in *F. domestica*) of licking her front paw and then massaging her face and top of head with it. In *F. domestica* the paw may rub the head either from nose to a point behind the ear, or the reverse direction. ^{I think} with Rosy only the one direction has been noted, namely with

paw starting just behind ear and being brought forward and down to vicinity of the nose. Rosy ~~When it has~~ often licks the fur of the other cats, as well as her own (just why this altruistic behavior I don't know); they purr at this but do not venture to lick her in return. Sometimes, like a dog, she nips and tugs at places in her fur with her incisors. These places may be matted areas, or possibly flea-infested, but I think the former.

Sept 1, 1933. Placed in their outdoor cage at abo C. P., Rosy and Polly, ¹³⁰ four weeks indoors and now out for the first time, commenced to 'pull off and' swallow grass blades eagerly. This they kept up for at least five minutes. Benson had given them a few, but found they had to pluck them from the plants themselves, as they did not care to pick up and eat any blades which might be lying on the

ground.

Sept 2, 1933 Alp. Ranch. A brown
 [131] frog placed in the cat's cap
 called forth the usual pursuit
 tactics. Romy took it into
 her mouth, just once,
 immediately dropped it, shook
 her head repeatedly, kept
 licking her lips, and would
 have no more to do with
 it. Polly did exactly the
 same, except that after
 a while he began to
 play with it again, with
 his paws, not biting it.

Dr. D. A. Wilton, Claremont,
 offers relates an anecdote
 where ~~in~~ some one fed a
~~salamander~~ ~~to~~ a caged raccoon, the
 coon eating the salamander
 and dying a few hours
 later.

Sept. 3. I have noticed from the
 [132] very first (perhaps already
^{74p} recorded?), that none of our
 cats remains active at night
 after the lights are turned

out. This is still true. They
curl up together and are never
heard from again until
morning. Often in the morning,
if it is early, we come into
the room and find them ^{only} just
awakened by our intrusion,
yawning, stretching, coming
out of their all-night huddle.

Sept 5. Took photos of Racy in house,
[134] playing. Pally did something
extraordinary today. The cats are
getting tired of canned cat food (they
have all, even Racy, vomited
a little during the last three
days); today E! discovered Pally
in the middle of the bare
(linoleum) kitchen floor, standing
over the 1/2 full food dish
vigorously scratching the floor
in front of the dish, as though
raking sand over it (as they all
do with excrement in sand
box).

Sept. 6, 1933. Racy appears to learn
[135] easily. During the last 15 days
Ethel has held bits of meat above

Rosy's head and said "Speak!" to her, until Rosy ~~to~~ (ordinarily entirely silent while food is being prepared, even though hungry), goaded to a state of marked suspense and anticipation, would break her habitual silence and give a little throaty growling noise. Today Ethel decided to make this reaction a habit with Rosy. Fifteen to twenty times in succession she offered bits of meat to Rosy, saying "Speak!" Rosy spoke each time received the meat each time, after the first few times ~~hardly~~ ^{only once} required ~~any~~ prompting each time.

Sept. 7, 1933. Had the neighbor's tomcat in again. Rosy is almost as big as he is now. The same general reactions as on earlier occasions took place except that Rosy is now nearly as large as he is, and he is much more concerned, much more anxious to escape than he ever used to be. Formerly he used to eat out of their dish, pay attention to the other cat's

only when they approached to within a foot or two. Now he is too uneasy to eat, wags plaintively at us to be let out, sneaks uneasily about the house, pursued by all the cats (even Polly, evidently sensing the tom cat's changed, furtive demeanor, does not hesitate to follow, at a distance, and to play within a few feet of him). He still slaps Rosy when she gets too close, and she throws herself upon her back, paws up, ready for action, when he does this.

one photo

This afternoon brought in a small ♂ alley cat, about the same size as Polly, nowhere near as large as the tom cat just mentioned. The reactions of Rosy were extraordinary. The newcomer was lapping milk when she approached and sniffed at him, and although he was uneasy (as shown by the fact that his fur stood on end ^{the skin of} and his back fairly curled up and down at her sniffing), he continued to drink. One ~~to~~ or twice he turned half around and growled

at Rasy, who held off from closer investigation and presently lay down under a chair to watch him, tail twitching. It was when the tom cat left the mill and walked across the room that the extraordinary occurred. Rasy started from her vantage point and stalked stiffleggedly after him (although on stilts), every hair erect, and tail held stiff (like that of Pansy, p. 56). Her ears were laid slantingly back and her ruff stood out so straight that her head assumed, noticeably, the outline of a horned toad's,

back
out like
rendered
uncanny
strained,



while the fur on the
of her neck stood
a mane. But what
the impression truly
was the loud,
gruesome howl which she
let out every few seconds as she stalked
after the daunted, furtive alley cat.
This howl seemed to represent, emotion-
ally, the defiant growl uttered by
Pansy in the presence of the (bigger)
strange tom cat mentioned earlier (p. 56),
except that there seemed to be very
little of fear in Rasy's state. The

cry is difficult to describe, being neither a snarl^{or a} growl. It sounded a trifle like the first long drawn, upwardly-inflected note of a coyote (prior to the succession of yaps which usually follows), but less prolonged and less musical. One might call it a strangled groan. The closest approximation I have heard is the strangled straining noise made by persons just about to vomit. Not at all ludicrous when made by this twisting, stilt-legged cat, it was more than menacing, was gruesome, insane-sounding, fearful. Strangely enough, Rosy^{still watching the cat,} would make this sound, after a brief period of silence, whenever I would call out to her. I ~~once~~ ventured once or twice to touch her, and even pushed Pally against her but she showed no hostility, did not even for a moment divert her gaze from the strange cat. At times, yelling like this, she would stalk over to within a few feet of the stranger who daunted, would throw himself, growling, upon his back. Rosy never ventured to

attack him. Strangely enough, right in the midst of these demonstrations Rasy would repeatedly stop and lick her self, perhaps merely as a nervous reaction. I got the impression that her instinctive "wires" might have been crossed, from this just as one notes it (apparently) in show birds which hysterically scream and flutter about an intruder on the nesting grounds, yet feed intermittently while in the midst of their agitated displays. When, on several occasions, the tomcat, still uneasy, slunk into other parts of the house, Rasy would prance stiff leggedly and furiously in his wake, fairly roaring out her mind out. Once or twice she pounced at him as he lay, protected beneath the sofa. Once, peculiarly enough, while she was chasing him he stopped with his head under the sofa, his posterior end protruding. Rasy came up, sniffed, committed no hostile ~~act~~ upon his unprotected rump. Possibly these demonstrations of hers had

some obscure sexual "groundthill". At last, ~~no~~ no further demonstrations having taken place, I dumped the tom cat down upon Rosy, when the latter was in the bath tub. The slippery ^{sloping} sides of the environment insured a thorough tangle. Result: a piercing yell of rage and fear from the tom cat, which, scared and bewildered, grappled with Rosy, bit her; and ~~then leaped out of the tub~~ (I think) a yell from Rosy, who leaped upon the edge of the tub and looked down at the crouching tom cat, her ears laid back tremendously excited. We remained the tom cat shortly after this.

Sept 9. As mentioned on pp.^s 72, 75, 89, 138 Rosy has gradually, by her strength, armature and overbearing ways, caused Pally so that he no longer resists her. She repeatedly snatched wood rats and mice from him today, snarling savagely when either he, or Shoes, or I came anywhere near; to approach her would have meant a serious mauling.

at one time she had her own woodrat
but nevertheless went after Pally's took
it away, held one in her mouth,
& crouched over the other. When under
these conditions she slaps the other
cat's faces she often does so with
wide ^{quick} side wise swings of first one
front paw and then the other, as in
a "one-two" punch of a boxer,
except that her punches are "hooks",
not straight punches:



She swings her whole body on these
blows, too, like a boxer. She can also
slap, with one paw, like a domestic
cat.

In spite of her formidable
strength and weapons she is as
incapable of killing her prey as
ever, and this applies to the other
bits as well. They pursue prey only

when it runs away, retreat when it comes at them. In this Rasy is certainly, through lack of experience, backward in point of development.

Rasy, as indicated earlier, has for a long time been completely house broken (also auto-broken); however, unlike the house cats, she never covers up urine, only feces, with sand.

Since about July 21 her ^{irides} eyes have been taking on a yellow color; now they are distinctly yellow ^{hard} ~~although~~ ~~with a greenish tinge~~.

Sept. 11, 1933. I should have mentioned a 140 long time ago a habit of Rasy's which illustrates the nice balance sometimes existing between desire and inhibition. This happens almost daily; an example today suffices:

Shoes had a piece of meat which Rasy wanted, but she did not want it quite enough to rush in at once and take it. She crawled close by, eyeing it. Ethel gave her a slight push from behind, at which she instantly rushed forward at



Shoes, seized the meat and made away with it. Very often when Racy is in a state of tense waiting, or is premeditating an ~~aggressive~~ assault upon one of the other cats, a burst of this sort will send her rushing across the room to her objective. If she is not ready to rush, however (as in the case of the neighbors' tomcats), the push will not even budge her.

Sept 12, 1933 Brought in the $2\frac{1}{3}$ grown ♂-house cat at which Racy had previously yelled so strangely. Immediately the whole scene was re-enacted. The new cat, called "Smoke", was not only defiant, but at times (whether from hereditary temperament or his ally upbringing) positively brutal. When Racy would stand and haul at him he sometimes made little rushes at her, snarling, spitting, and slapping. At these sallies Racy would back up a few steps, letting out a more than usually loud groan. Often she would seem to forget Smoke for fifteen or more minutes,

at which the latter would curl up and doze. By saying "now Rosy" and stroking her each time she yelled, I gradually, during the course of the afternoon, quieted her so that she no longer yelled. By night time she treated him like any of the other cats. Not so with Snarke, however; more beligerant than any of the others, he always spat and slapped at Rosy, Polly, and usually Shes when they came near, becoming partially accustomed at last only to Shes. His desire to play and his fear or anger tendencies sometimes are nearly balanced. For instance he would come up to a kitten, make a playful pat at it and lie on his side, but the instant it started to pat back he would lay back his ears, crawl, and spit, or even slap at the other, but.

Sept 13 - Snarke now more used to the others, only hisses when approached by them unexpectedly. Rosy tends to let him alone

because whenever she goes to play with him he becomes hostile. Strangely enough he whines and cries for food more than ever. Shoes, although fat and well fed, is more affectionate than any except Puss.

Sept 14. Status quo among the 4 cats as before except that when I gave them mice Racy slapped and growled even at Smoke when he went near her, and later she barged right into him, in spite of savage snarls and yowled his mouse away from him.

When she is with mouse she becomes quite beside herself with rage if anyone interferes.

Sept 15. Not as solitary as felines are supposed to be, Racy always meows and sniffs eagerly at doors, paces up and down restlessly when the other kits are removed to an adjacent room with door closed between. When the door is opened she bounds in among them with evident relief.

Rosy has lost her lower ^{milk} canines and the new ones are just emerging through the gums as tiny short projections, one ^{slightly longer than the other}. Her upper ^{canines} are just barely showing ^{through in front of the milk canines}.

Sept 17, 1933 Rosy and Shaes have a mutual attraction for each other as previously mentioned. ^{exact upper canines in front} They usually sleep together, and Rosy before going to sleep, usually licks him as well as her self, at which he purrs loudly and snuggles up against her.

Tonight I gave all three cats woodrats. Rosy ^{when} given hers, became a veritable wild beast, growling as loudly and savagely as a trapped ad. bobcat, when approached by either the other cats or by us, and ~~leaping~~ whipping her stubby little tail from side to side with great rapidity. From us she would run, carrying her booty and making the

house resounded with her growls. Toward the other cats she showed no such respect, however. Continually, during her meal, she would espie another cat eating its wood rat, at which she would drop her own, rush savagely at the other cat and snatch his rat away, growling furiously and inflicting upon him such punishment with her claws (and teeth, I suspect) that the air was filled with his shrieks and yells. This she did to both Shoes & Smoke. I was kept busy retrieving her abandoned rats and giving them to ~~the~~ ^{whichever} cat which had just been robbed.

The very moment Rasy had eaten her last mouthful of wood-rat, however, her savage demeanor vanished; she licked herself and let herself be approached and picked up just as usual.

Almost always, after a heavy meal of meat, Rasy visits the

water dish, lapping for several seconds.

Sept 21, 1933. When I gave Rosy a skinned Cooper hawk she was at first crazy to get it, snarling back and forth trying to get at it through the cage wires, as usual. But when it was put down in front of her, and olfaction replaced vision, her frenzy suddenly vanished. She spent several minutes walking around it, sniffing gingerly, instead of grabbing it and making off with a hoarse growl as under usual circumstances. At last she began to bite it here and there, and after a few minutes of this she commenced to feed in earnest, in about $3/4$ of an hour leaving nothing but the synsacrum and skull, as far as I could determine. ^{wt. of hawk, unskinned, .460.9g.}

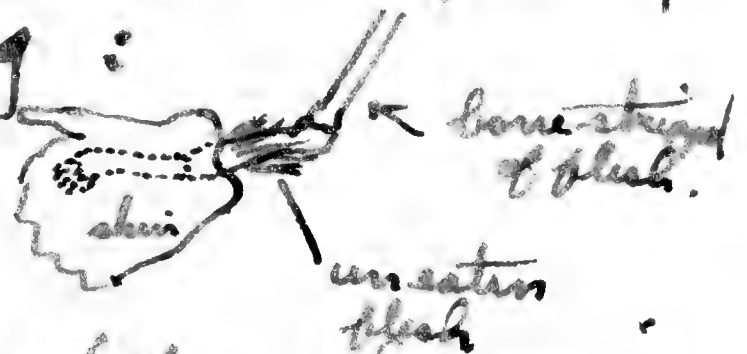
In the evening I gave her a live, uninjured rabbit. She seized it by the neck and made off, growling. Gone was the fear of living, moving prey. As it was dark I could not see the

details of killing. By next morning, however, nothing was left of the rabbit except a few vertebrae ^{of the skull} and the fur. She had started to eat it, & did also, at the head end, namely just beneath the chin.

Sept 22, 1933

At ab. 4 P.M. I gave her another live rabbit. This one she also showed no fear of, leaping all around it and upon it, seizing it by the neck and dragging it about, then letting go of it and standing over it, waiting for it to move, the move to be followed by a lightning pounce, or sometimes merely by the thrusting out of a single hooked paw, the claws catching in the skin of the rabbit and dragging it back to her again. Later, when the rabbit had become very tired and had crawled into a tiny, double-entranced tunnel made by a bunch of brush, Rags would come up behind him and prod his rear with her claws,

making him move forward and expose his head at the other entrance, at which she would run around to the front of him and attack that, again exposing his rear. Occasionally she would reach in and haul him out bodily with her claws. In about an hour the rabbit was dead and Rory was eating it, having commenced this time, on one of the haunches. Often, in eating prey with fur, like woodrats or rabbits, Rory will, if she happens to get started properly, peel the hide back as she eats, especially in the case of a leg:



I got rid of Smoke today; he was always meowing. He and Rory had become fairly well accustomed to each other, sometimes sleeping together, but he still hissed and growled at her at times; ditto with him and Shes. Cats' natures certainly

ramp.

Sept 23, 1933. An example of Rasy's memory, and her growing independence as well, was furnished today:

On Sept 21 I had had difficulty in getting Rasy into her large traveling basket in which I always transfer her from the house to the car. Either something had scared her or she did not feel like being caught. At any rate when I tried to pick her up she growled and retreated under the bed. I was obliged to dislodge her with a broom, corner her in a narrow passage, and transfer her, growling loudly, to the basket by main force, having first taken the precaution of wearing gloves.

Today, more than 48 hours later, when I took the basket to the center of her outdoor cage and started to pick her up, preparatory to transfer back to the car, she bounded away from me, again displaying the ^{same} furtive, darting manner ^{as before}, with head held low and ears laid back. All efforts to catch her

baye-handed were unavailing; when actually cornered she would erect her fur and growl. Again resorting to the gloves (never used until Sept 21), I cornered her, finally seized her, despite growls and half-hearted attempts to bite. ^{immediately} Her active, powerful ^{heavy} body and fierce strugglings were more than I could manage, however, since the ~~heavy~~ ^{thick} gloves did not allow a firm hold upon her tight neck scarf ~~and~~ ^{or} the skin over the small ~~of~~ her back. Loudly growling, and trying to rip me with her claws, she nearly wrenched free, forced me to press her to the ground with all my might while I struggled to get a firmer grip. I knew that if she got loose this time I should not be able to catch her without a mauling, although it was not certain that she would actually attack me of her own initiative if I let go. By nearly choking her first, I got a good grip on the gasping struggling cat, popped her into the

Basket, started to take her home, but changed my mind, realizing the impossibility of any further auto transfers. I let her, out-manipulating the Basket from outside the cage. She bounded away into the farthest corner of the cage, ^(but silent) mad and aroused, as one could see by the erect fur, especially the ruff at her cheeks, and by the angry twitching of her tail. I left.

Sept 24, 1933. Revisiting Pansy's cage I found her hungry and no longer angry, but ready to bound away whenever I tried to stroke her. Putting food into the Basket, I clapped the lid shut when she jumped into it, sped away with her into the auto to the wild lands of at the Base of Midego Hill (Alp. Ranch, U.S. Geol. Surv. Map), and liberated her just as night fell. Jumping out of the Basket she trotted away, moving a few steps, then looking about and sniffing, till she vanished into a wooded ravine.

Finis Pansy

addenda - Found many scales and warts on the bodies of shoes, and, earlier Pansy, made by Pansy's play and by her meat-robbing tactics.

December 9, 1933. Alpine (Rolph) Ranch,
San Mateo Co; Calif. A Mr. Simpson,
game bird breeder on a week end
visit up here, told me that today
(early afternoon, I think) he watched
a bobcat hunt for, and successfully
catch, a gopher, at the "Glass Ranch"
section of the Rolph Ranch (where
I have noted bobcats before).

Coming over the brow of a hill,
Simpson, himself unobserved
discovered the bobcat below him on
the open hillside. It was walking
from one of the numerous gopher
mounds to another, sniffing at each.
At length it evidently detected one that
was in active use, for it sat down
in front of it like a cat



and waited several minutes.
Suddenly it shot one of its forepaws
into the hole almost to the elbow
and with a scooping motion
with drew it. — and with it a
gopher, which it immediately seized
with its teeth. At this point
Simpson rose up into view



Lynx rufus

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and whistled, at which the cat
bounced off with the gopher.
Simpson, on walking down
to the spot, noticed bob cat tracks
at many of the gopher holes
there, and some of the holes
had been scooped out just
as in the case of the one from
which the gopher was captured.

Lynx rufus

120

Stomachs of bobcats trapped by Edmondson, state trapper, operating under Gordon H. True (Economic Biologist, Div. of Fish and Game) on quail refuges in vicinity of Palmdale, L.A. Co., Calif., showed following data:

Nov 7, 1933 1/4 full, of feathers, and lower mandible of western tanager.

Jan. 6, 1934 - Alp. Ranch, by Q. J., ab. 10 P.M.

Heard a considerable snapping of twigs in the brush about 50 feet from the shack, as though a deer, or similar large animal (or animals) were moving there. A moment later Ethel, by the light of a dim flashlight, saw a slim, tawny shape bound or run quickly, from the place where the rustling was, ^{near her tent} out into the open toward the shack. Upon losing sight of this animal, concerning whose shape and size she was uncertain in the dim light, she called to me. I walked about at the place where it had disappeared, with a bright light, but could find no tracks in the hard mud. Just as I got back to the shack, however,

the silence of the night was broken by a series of rather loud, rasping staccato snarls uttered in rapid succession, as if something either had hold of or was directly menacing the animal in question, so that the latter was very excited and defiant, or else being hurt and frightened.

After a second or two the sounds stopped and we heard some more rustling in the brush about 200 ft. from where the animal had been seen ^{ang. e.} with the flash light.

^{short,} A moment later the same sharp, rapidly uttered snarls were heard again - at the same spot; then I heard two low growls, followed by a thin faint mewy mooooe. After that there was silence.

Once about a month ago I heard these snarling notes near the shack, also ^{once} last year about this same time of year, I think.

My conclusions

- ①. Noise was made by a predator, either frightened or angry or mating, and was occasioned

^{immediate proximity}
by presence of another predator,
more than likely of the same
species, but perhaps of opposite
sex.

- also
changed
location
- ②. Due to the prolonged and inter-
mittent sounds - both of rustling
and of snarling - one may
be fairly certain that the
animal making the noise
was not ~~exactly~~ actually captured
or killed, although it was
probably being closely pursued.
- ③. That the animals, or animals,
were greatly excited is
shown by the fact that
they did not silently retreat
during the time (5 min. at
least) that I was prowling
around looking for them, but
recommended their uproar
when I retired.
- ④. That the animal heard was
a bob-cat is indicated by
the low growls and by the
meowing. It was certainly
not a domestic cat and
could hardly have been

Lynx rufus

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any other predators

It is further indicated by the fact that local trappers (J. Ott and Isidoro, both U. S. Biol. Service trappers) claim that during the mating season bobcats do caterwaul and yell; also this is about the time that bobcats might be expected to breed.

Domestic cats, according to reports, and also my own observations, growl and snarl at intervals during copulation.

Contents of a stomach taken by Chas. J. Hayes, Fish and game trapper on State Quail Refuge 4 mi. S. of Perris, Calif., March 13, 1933 - rabbit (or?) fur

A stomach taken by J. Ott, Nov. 29, 1933, on the Ralph Ranch contained whiskers and trace of hair of a woodrat. (*Citellus* ♀).

Another taken by Ott, same place, Dec, 1933 contained whiskers and fur of *Sylvilagus l. bachmani*.

Fur taken by Chas. Edmondson, trapper on State quail refuges near Palmdale, working under Gordon rule, were as follows:

Lynx rufus

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- ♂ Mar. 10, 1934. Ear tips of jackrabbits; fur,
feet, jaw of cottontail.
♀ Mar. 12, 1934. Trace of rabbit (sp.?)
fur.

Melephites occidentalis

7/8/30.

Los Banos Game Refuge, Merced Co. Calif.
Dried skin of one seen - had been dead
some months, possibly poisoned (see under
Citellus). Skins said by Mr. Lellan to be
rare in this section.

4/5/31

Kauffman Ranch n of L.B.D. Refuge
One seen dead on Mud Slough - across
on other side.

6/1/31

L.B.D. R. just w. of Ford near M.S. Slough
7:45 or so - early twilight; sky still
suffused with orange. A large dark
shaggy individual suddenly observed
just in front of my Ford running
- or more correctly galloping -
away at top speed. For a good ten
minutes thereafter I circled around
it, keeping it trotting at top speed
and heading it off from all possible
eavesdroppers - it was flat on this
santa Ana place and quite open. At
last my car stuck by the edge of a small
pond of very alkali (yellowish!) water
so I jumped out and continued the
chase on foot. Heading the skunk
toward the pond & keeping some
six feet behind it I forced it to

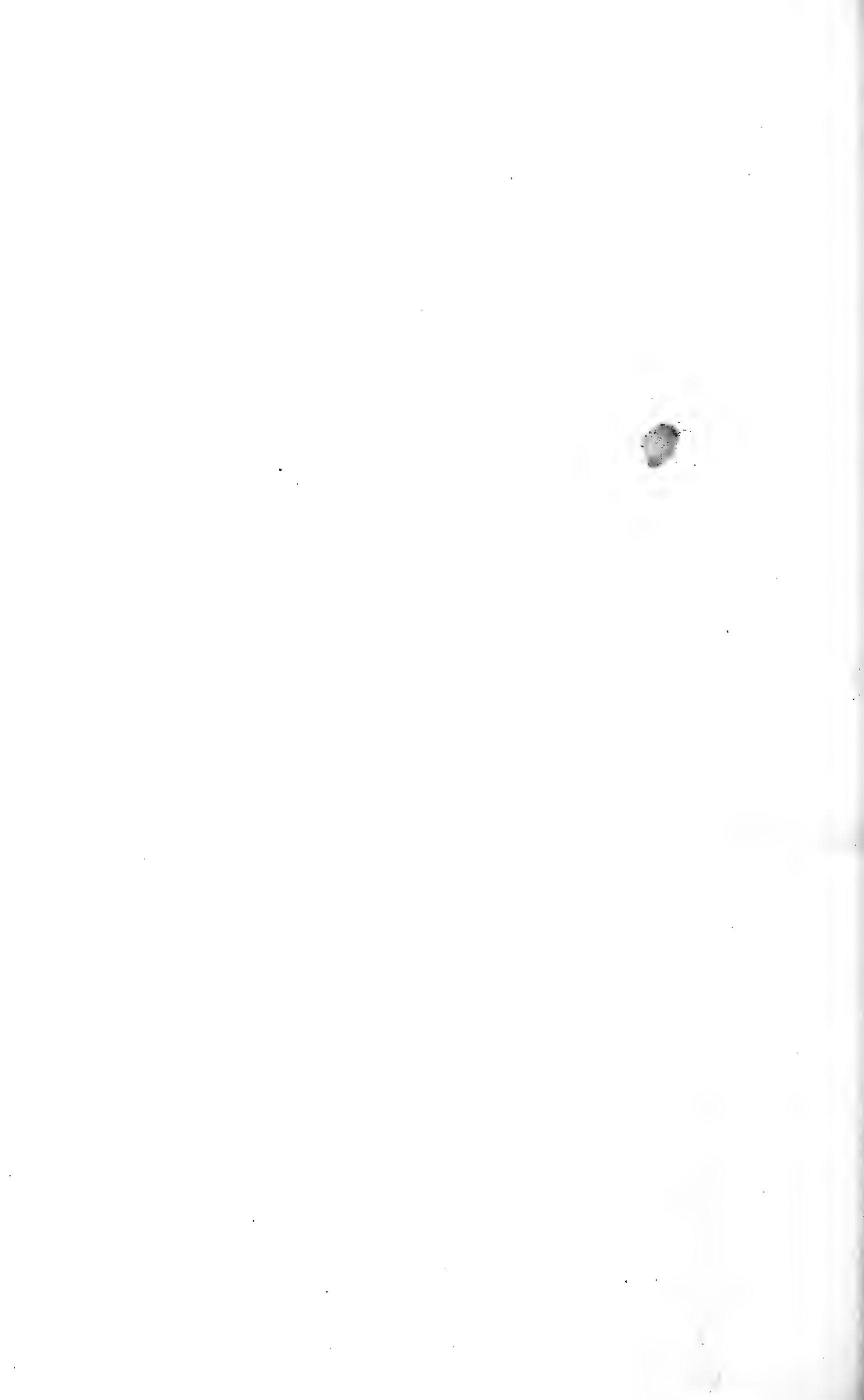
Meplute occidentalis 2.

wade out into this very mushy very disagreeable (albeit warm) ichali pond. Here we repeated the chase, I circling about the skunk and keeping him in the middle of the pond. When he would start to cross to the other bank, I would run around and confront him on that side, forcing him to turn back. For a full ten minutes more I kept this up. He was moving slower now, was very wet and would often stop in the water (it was up a little above his belly so that he could wade about and did not have to swim) as if undecided what to do. When I would move up to him at such times he would hold his ground and even try to make a little rush at me, with his mouth open. It grew darker and I turned on my 1200 ft beam flash light - 4 ft from his face, at first this baffled him but toward the end, especially when I began slapping him with a gunny sack to scare him quicker, he began to rush the flash light quite nervously and

Mephitis acidentalis 3.

it was well repulsed. At last seeing that he showed no sign of giving up and that it was now nearly dark, and my Ford stuck in the mud, I let him reach shore. For a while I followed along behind him - he was running straight down the road, then I ran around in front and tried to block his path but he came right on - mouth open - viciously. Being utterly unafraid I finally let him alone and saw him still bathing, disappear down the road.

Astonishing power of endurance he had been trotting steadily for about 25 minutes. Several times he "shot" me from distance of 4-5 ft but it didn't land in my eye and so did not bother me at all. I can well understand a coyote or a fox and not hesitating to kill a skunk if hungry; I would too. I forgot to say that when I first began to chase him he would, if too closely pressed (I nearly ran over him several times) stop, face me with tail high but not arched around in my direction like a *Spilogale* and scratch the ground very loudly ^{with its fore feet} in the same way that a *Spib* stamps it - as though to warn the enemy of its presence.



4.

Myxotis occidentalis

Dec 13, 1931

Alpine Buck Ranch, San Mateo Co., Calif.

Just inside the main gate at the foot of the hill I saw the fur of a skunk; it had been dead so long that nothing was left but this scrap of fur; might have been the tail.

Butler says this skunk was hung to the gate by some outpider; the locality where killed, there is unknown, although doubtless it was not far away, and probably in the canyon.

Aug 6, 1932. Mc Cakes' cabin, Indianpoint Lake, (Barkerville P.O.), B. C., Canada. Ab.

4:30-6 P.M. Discovered a medium sized skunk at the back door of the cabin, busily scratching and turning up dry grass into little piles, which it then carried under the cabin, doubtless to its den. The skunk would waddle along the foot path until he came to a bunch of dry grass, and commencing to paw and scratch it toward him vigorously, using his front feet, simultaneously. When the bunch failed to become dislodged he would chew it close to the ground, thereby severing the

Nephus aculeatus

5

stalks from the rook. He made quite a loud scratching and rustling noise while at the rook, and, conversely, did not hear me up to my elbow in the cabin, behind the screen door, 15 feet from him - excellent illustration of the lack of alertness of these beasts. His actions were, in their impulsiveness, much like those of a bird, it seemed, for he would gather a small ball of ^{hay} and then, as if lured away by other, larger, more tempting clumps, drop or rather leave it in the path and wander off for more, which he usually dropped too. Presently he disappeared beyond my line of vision, and wandered for about 5 minutes just out of sight, after which he made a big, doubtless with grass, under the cabin once more. In a moment he was out again, and meandered clumsily down the path toward the woodpile, when I saw him no more. Mrs. M. Cole has been seeing this shunk for the last 10 days,

at midnight, as it has been gathering grass. Her observations are much more complete than these. They illustrate, again, the lack of alertness of these animals; on one occasion the cubs came up and sniffed at her and actually touched her feet without taking alarm.

October 1, 1932. Alpine Creek Ranch, San Mateo Co., Calif. Los Trancos Road, about 6:45 P.M. Nearly ran over a adult skunk that was lying down the middle of the road.

November 28, 1932. Alpine Creek Ranch, 100 yds below the Maricao Road, 5:15 P.M., dusk. One of these was slowly walking through a scattering patch of thistles as I came by. Being in a hurry to get some quail I did not stop long to watch him. In about a minute he caught sight of me as I moved past near him, and at once he turned and hunched up the slope again and into the thick brush.

December

Feb. 21, 1933 - Same general locality as the

Neotoma occidentalis 7.

above notes (Nov 28). Within about a 200 ^{yard} ~~foot~~ radius circle, on the brushy hillside where the "Canyon Covey" lives, I saw ^{for the first time} within the space of about an hour just after night-fall, three adult shunks out foraging. This indicates a large shunk population for the region - yet quail are abundant in this section.

March 14, 1933. Same place as above, after dark as above. Almost bumped into another of them. It ran away down the slope after I had (unknowingly, because my flash light was off) come within 8 feet of it.

1

Microtus californicus sancti diegi

Between
mch 31 and
april 13, 1928
then 10/14/30)

Carbon Canyon, N side, Puente Hills, L.A. County(?)
Calif. During the time that I was visiting a
nest of *Buteo l. calurus* which was about $\frac{1}{4}$ mi
from the road I saw these mice on each occasion
in great numbers. The nest was visited
3/31; 4/9, 15, 22, 29; 5/6, 13 (see my ^{first} note book pp. 398-
401) and although I took no notes on it I
remember that all of the later visits were during this
Microtus peak. The mice were to be seen in
broad daylight each time, usually in the act of
dashing along their runways in great haste to
get into their holes at my approach. Sometimes
they would be almost stepped on. This would
happen every dozen paces or more, from
the road up to the nest, the route following
up a grassy gentle slope devoid of trees and
bush, the grass quite thick and matted.
Charles Bradford reported this same phenomenon
at this time. The year before there was
nothing of this sort, and the year following
I saw no Microtus, although this particular
locality was visited regularly on account
of the nest each year.

Minutes

5/9/31

Los Banos Duck Refuge, Los Banos,
Merced Co. Calif. Salmon Slough
over flow. Watched a gopher snake
(*Pituophis catenifer*) eat one - see under
Pituophis - and then saved the body
after photographing snake and prey.

May 12, 1932

specimen
No. 10
E. L. Linnell
Sumner

Alpine Creek Ranch (Ralph Estate),
San Mateo Co., Calif., by quail
enclosure. See under *Pituophis catenifer*
p. 5 for description of a meadow-
mouse nest containing ten young.

About a month ago I
noticed numerous runways in
the short grass by the side of
the road that leads from the
swimming pool to the quail
enclosure. Mice could often be
surprised running along them
in the daylight.

The ten baby mice were saved
for the M.V.Z.

June 13, 1932. Alp Cr. R. See under *Lophortyx*
about June 8 for account of a foraging
meadowmouse in the feed patch of
the quail enclosure, and the
reaction of a ♂ quail to it. See
under June 13 for a continuation



Microtus 2.

of the same sort of observations,
under *Lophantys*.

While I watched one of these mice
this time I saw it dart out from the
tall clower, seize a whole ^{green} grass
shoot snap it off about ~~at~~ a level
with the ground and dart back into
the clower with it, out of sight.
I don't know whether the mouse
was gathering the grass to eat
or to build a nest with.

A quail egg has been lying for
weeks right near where the mice
are ~~often~~ crawling without being
disturbed. Of course such an egg
may not be stimulating to the
extent that a nest full of warm
eggs bearing the scent of the
parent bird might.

Aug 18, 1932. Alp. Co. R., Ay Q. S. Meadow mice
are not strictly diurnal, for I
caught one in a rat trap at about
10 P. M. (it gets dark by 8 P. M. at this
time of year). I have an impression
that one other *Microtus*, caught
by the same trap, in the same
place, was taken at night, too, but

Meinotus

3.

I can't be positive in this ^{second} case
because I didn't hear the trap go
off.

Mustella

April 30, 1932 Canyon road leading from
Menlo Park to the Calpine Creek
Ranch (Ralph Estate), San Mateo Co.,
Calif., at about the fourth curve
in the road after one leaves the
pavement, on the way to the Alp.
Creek Ranch, 11:30 A.M. As I drove
along a weasel ran out from the
thick brush, crossed the road, paused
for a fraction of a second just
at the edge, on the other side,
and then vanished again into
the brush.

Mustela xanthogenys xanthogenys!

5/28/30 ^{Weasel} Castro Valley 6 mi S. Hayward
One found in road still limp
and with blood not dried.

[Note from Cheyney. Weasels
are to be found at Alvarado
near the Sugar Works in Oakland.
See Cheyney about it
some time]

8/18/30 Pomona, Calif. on Valley Blvd nearly
opposite the old quarry. One weasel seen
running across paved boulevard from
weed filled ditch on one side to weed-
bordered fence which bounded a small
nursery on the other side.

3/7/31 N.E. of Ruth Lake, Los Banos Duck
Refuge, Los Banos, Calif. 2:45 P.M.
One seen standing up half in and half
out a squirrel burrow. Presently he turned,
shook himself and disappeared down
the hole, after about 2 minutes he
popped up about 40 ft away, emerged
only halfway from the hole and
paused to survey the country again.
We were sitting very still in the

Mustela xanthogenys 2

car 100 ft away and although he looked right at us he appeared not to be alarmed. Shortly after this he again shook himself and disappeared again into this second hole. This happened two or three times without anything new happening except that once he yawned for a moment. Then he disappeared again and came up where he was first seen, then came into the open and ran about for a few dozen steps then ducked down and reappeared 50 ft further on. This also, happened several times. Scratched himself with rt. hind foot once too.

4/28/31 L.B.D. Refuge by 2nd Redstart camp.

6:50 P.M. (Dusk). One of three men past the parked car at 6 feet and stopping for a fraction of a second at a squirrel hole 15 ft from the hind wheel, in order to look down, disappeared inside.

6/6/31

L.B.D.P. Mud Slough by rabbit tree. Caught one in a box trap baited with a piece of rabbit ~~skin~~ killed 5/30/31. This bait was crawling

Musita x. xanthogenys

with fly maggots and alive with
carrion beetles! True, some about
a month ago a drop of oil of cinnamon
seed had been placed in it but I doubt
if a weasel would have been lured by
that after all this time and with the
other odor drawing it out. This
weasel showed its characteristic fearlessness
in the presence of Mc Lellan's dog Dick
by giving a little high pitched grating
chirp or bark - like shoving a light
resonant block of wood into a small,
very high speed disk saw for an
instant - and tried to squeeze through
a chink in the trap and get at the
dog - which was looking hardly only
three inches from the nose of the weasel.
Not at any time did the weasel
retreat to the opposite side of the
box as most animals would have
done.

Mc Lellan told me the other day that
he found several cinnamon leaf
eggs out in the open - either blown
there by the wind after being sucked
dry, or else carried there by the
warblers in the fruit paper -

Muscle x. xanthogenus 4

All with holes about as big as -
half ones thumb. He thought it
was squirrel work but I now
think it was weasel.

- 6/6/31 Caught another of these - at least 2
inches from the first. <sup>By the way it is only ab. 200 ft
from the nest of Quaggaedule
that was broken up by egg, and</sup>
- 6/7/31 They are fighters! Transferring them
by sacks into their transportation cage.
I was bitten by each one through the
thick gunny sack even though careful. They
could see my hands through the sack
even when as much as 20 away and
in each case they did the diving after
my fingers, not my fingers after
them. This second one was caught with
fresher - better - meat.
- (see Quaggaedule
p. 1)*

6/15/30.

Myotis

Meadow Ranch, between Red Bluff and Susanville,
Calaveras Co. Calif. Open rocky (lava) hill side
on a very bright hot after noon (temp. about
95¹⁰⁰° F). Bat seen flying about for about
two minutes about 40 ft up in the air.
After circling about for the above time it
pitched down and fluttered into a crevice in
a boulder about 4 ft high, one among
innumerable others on the rocky hill side.
Bat may have been scared out by house
but if so it did not return to original
location for the boulder mentioned was
75 ft. higher up the slope. Specimen saved.

Neotoma fuscipes annectens

April 9, 1932. Alpine Creek Ranch (Ralph Ranch),
San Mateo Co., Calif. By mail
inclosure. I caught two wood
rats (adults) in ^{the same} a box trap, set for
rabbits, on two successive nights.
The trap was originally baited
with lettuce, a few sun flower
seeds, and a few drops of currant
seed oil (see under *Sylvilagus*, both
at Los Banos, and at Alpine Creek
Ranch, for effectiveness of the scent
as a lure). I think all the lettuce
and all the sun flower seeds (put
in there 10 days earlier) were gone
since I had already ~~set~~ caught
a *Peromyscus californicus* in the
trap a few days earlier; certainly
the lettuce must have withered
away long ago. The first rat
might have been lured thither
by traces of seed, but I think
his capture was rather to be
explained by either the animal's
ingenuity or by the persistence,
possibly, of some of the currant
seed aroma. The second rat
must have been lured inside

Neotoma fuscipes ^{2.}
~~annexus~~

by the smell of the preceding
victim, or by the c.s. oil, for
there was nothing else in the
trap at that time. - I had
dumped rat and all out of the
trap into a pail ^{at the time of the} preceding
capture. One of these rats was
an ad. ♂ and the other an ad. ♀,
but which came first I don't
know. One of the rats jumped
out of the pail into which I had
dumped it, and ran around
inside the enclosure before
being caught; it gave vent to
several squeaks, prolonged, when
finally captured.

The ♀ rat (see in my old original
journal for measurements) had
four well developed mammae,
evidently functioning, but no
embryos; evidently the young
had already been born.

April 13, 1932. Same place; same trap. Caught
another rat there last night (as the
night before?; was not there yesterday).
It was an ad. ♂.

April 30, 1932. Same place. Caught a woodrat
in one of the other traps (the ^{provisional} ~~provisional~~ ^{most} ~~most~~).

about a week ago, and another today. The presence of a wood rat odor around one of these box traps certainly is a strong inducement to other wood rats to get caught there too.

May 3, 1932 Caught a half grown wood rat today (in a different box trap from any of the above); it was dying of starvation, so must have been in the trap some time. Weight was 123.6 gr. at time of death.

November 6, 1932. Along B.R. Wood rats seem never to be very numerous in any one locality; time and time again, in my recent trapping activities, I have caught two, or sometimes three, rats at a nest, or in an old, rat-infested building, and then have failed to catch any more there. The rats caught would usually be shot right away, during the first two or three nights, indicating that they are not at all wary. shot. About a month ago I caught or three or four in the vicinity of the cabin, and have not been kept awake by any since, until this

Neotoma fuscipes annectens. 4.

week. Apparently this takes until now for the influx from surrounding populations to make itself evident. I think the new-comers have come in from several directions. One at least, crossed over the Q.D., running along the top wire (I could hear him distinctly, more than once), from the east side. Seemingly the presence of large numbers of ripening scarlet runner bean pods on the sides of the cabin has helped to draw them; at least, I noted that the rat mentioned just above dropped a much-chewed green pod in his runway (behind a board) when I frightened him last night. It took me two nights to get this kind; he lived on the e. side of the Q.D., and whenever I arose (sleepless and cursing) in the middle of the night to shoot him, he would scamper back over the wires to his own side. Three others I got the first night shooting him with a .22 which I held with one hand while I kept a flashlight turned on his eyes with the other.

Their eyes shine a dull translucent bluish ~~at~~ certain angles and a bright amber color at other angles. I have two single nooks on the cabin, one on ~~op~~ the other. The rats get in between them and feel safe sitting there, even when I bring the muzzle of the .22 within 4 feet of them. Probably ^{the} ~~the~~ ^{darkness} light prevents them from seeing me very well too.

The whites have a habit of drumming very loudly, presumably with their front feet, the resulting sound, when made on a dead branch, or on a single nook, being a loud rattling sound, audible at least 35 feet away probably 50. I just what circumstances call forth this reaction I do not know; I have heard it coming from woodrat nests, on dark days, several times, as well as at night.

All four of the rats I got had large fat fly larvae in the skin just under their chins, but nowhere else. Three had only one larva each, but one had four,

Neotoma fuscipes
macrodon
arizonae

6.

making a large cluster of lumps.
Why the larvae should be under
this crust, particularly, I do not know.
I u rats can reach that place with
their feet. If it is because they cannot
reach the place with their teeth then
why are there no rats on top of their
heads? Perhaps ^{it is the only place that count, but} the rat lays its eggs
only in more or less folded areas
such as the neck region, where the
hair is long and dense (rather than
on top of the head).

Dec 28, 1932. Got two more wood rats recently.

Altogether during the last four ^{year} months
I must have got nearly a dozen wood
rats, and since the shack was built
nearly two dozen; my previous
records will show this roughly.
This steady influx of wood rats
gives us an idea of the pressure of
population pressures. When I kill
one, or a pair, of the rats, I cannot
trouble for a week or two, but
after that the territory of the defunct
animals is taken over by a
new comer, and I begin to catch
wood rats again. Only by constant

Neotoma fuscipes minorata? 7.

effort am I able to keep them out of territory which is suitable for them. The same state of affairs has occurred during my trapping activities at the Q.J. "garage". As soon as I let up on trapping for a few weeks the place becomes repopulated again.

During the late summer many of the invading rats were $\frac{3}{4}$ grown individuals, but during the last month - 6 weeks, they have all been full grown ones.

Feb 21, 1933 Alp. Cr. Ranch, near M. Indego Mount-
ain. While stalking a quail roost on a
pitch dark, foggy night, about 9 P.M.
I heard the usual drumming of wood-
rats in the adjacent brush. In addi-
tion, however, I heard one ^{rat} squeak
loudly twice. As the rat was only
about 15 feet from me, in the
brush, I think that it squeaked not
because of any ^{disturbing it} enemy, but probably
because some other wood rat was
close by. The squeak was somewhat
rasping in tone.

The drumming noise made

Neotoma fuscipes
macrochaeta

8.

by woodrats, mentioned by me earlier, is made not with the feet as I had assumed, but with the tail (Donat, 1933, Journ. Mamm., 14: 19-26).

April 11, 1933. Alp Cr. R. Young woodrats are being born, probably the first for this season (see also *Sylvilagus bachmani bachmani*, this date, for first young rabbits). Mr. Passen and Buster McEllan, while pulling out a dense tangle of spanish broom 100 ft long by 75 ft wide found several nests all with small, blind baby rats, furred, but as yet unable to crawl away. One I saw measured about 4" in length.



July 3 - See under *Crotalus*, p. 1, for note of rattlesnake having eaten a woodrat.

See under *Lynx rufus* about July 1, for account of a woodrat bluffing two house kittens and a 2 month old bobcat which for several days chased it about in a cage but were afraid to come to grips with it. This woodrat, when I finally

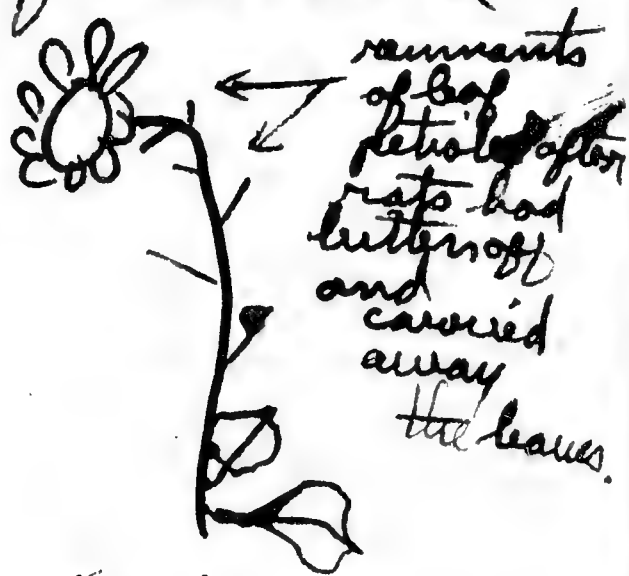


Nestoma fusces
mauratus

9

removed it from the kittens' cage squealed shrilly, quite like a mink but only somewhat less piercing, while I held it in my hand. I have heard this noise more than once from woodrats in the woods around here at night (see note of it once about April, Mindero's side of Alp. Ranch).

Sept 9, 1933. Previously I have mentioned that woodrats make frequent trips at night to the scarlet runner beans growing on the Q.D. shack. This summer, there being no bears, they are stripping the large, succulent leaves from the sun flowers and carrying them off.



Jan 4, 1933 Alp. Co., Ranch. 7 P.M. ^{actually} Saw two woodrats making their characteristic rattling sound, by means of a

Nestoma fusipes 10
macrolopes

powerful flashlight. As Fae Donat has described it (Journ. Mamm., 1933), they vibrated their tails rapidly against whatever they were perched upon (in this case a 6" diam. limb of an oak 15 ft. up). When I was at a distance they frequently gave harsh squeaks - perhaps of some sort of social significance; at least they were not squeaks of signifying the presence of an outside enemy. When I was close up they gave no such squeaks, but stared at me and rattled their tails.

Odocoileus

3/19/30

S.E. end of Quejeto Ranch, San Diego Co., Calif.
Very fresh tracks in sandy mud along
stream bottom, in wooded canyon leading
down from brush covered hills. Tracks of
only one individual, apparently.

8/21/31

Alpine Creek Ranch. Small fawn
brought in by Jimi Ralph and party. B.
McLellan says that if a dog, coyote, prong,
or anything touches a fawn the
mother will desert it.

11/1/31

Alp. Cr. Ranch, "three cypress trees
enclosed by circular fence". Started
out a doe and her large fawn about
9:45 A.M. as I went through there.

January 13, 1932. This morning we found the
fawn mentioned above (under 8/21/31)
dead in its enclosure by the dog
fence. Buster McLellan said that
it was still warm at 6:30 A.M.
therefore he found it. It had arrived
the previous day, and was cold
and windy that night, but in view
of the excellent shelter provided by
the shed - quite as good as the
horse stables in this respect, since
the door is very small, and away
from the wind - it hardly seems

Odocoileus.

possible that the cold weather should^{2.}
have been responsible. The animal,
when found, lay in its straw bed in
the far corner of the shed, curled up
as though asleep. Buster said that it
had showed no signs of weakness as
previous day, or at any other time
since the first few days of captivity. It
was still being fed from a bottle but
was taking hay in addition.

Jan 16, 1932. To day I dissected the
animal in an effort to locate the
cause of its demise. Data are as
follows:

Nasal passages - free of mucus ^{and} exudate;
~~posterior nares~~ normal

Mouth and esophagus - as above

Region just anterior to ~~valve in floor of~~
~~gullet which leads to windpipe~~ ^{regloris} - about
5 large flat larvae in one small

pocket of flesh about the region corresponding to our navel. There was no apparent inflammation at this point, nor did they seem to be of sufficient mass to constitute a serious obstruction; they may not have originally been there anyway, but may have moved down from the posterior vena.

4. Stomach - full of food, forming a large mass, but seemingly not abnormally distended - ^{general} appearance ^{including color} as well as contents quite normal; no gas.
5. Small and large intestines full; seemingly normal in color, size etc. Faces normal.
6. Pancreas - seemingly normal.
7. Urinary bladder full; normal.
8. Kidneys somewhat light in color but apparently normal.
9. Liver - dark red, no light patches, takes with ^{liver} no flukes, seemingly quite healthy.
10. Heart - nothing abnormal noted.
11. Wind pipe - free from obstructions.
12. Lungs - perhaps in a pathological

condition. They were a deep reddish pink - not a light pink such as one usually sees, and they were marbled and splashed with irregular dark red areas as of blood. Then I cut through the lungs across these dark, blood-colored areas some blood oozed out - but no exudate of other nature; the dark areas were seen to extend through the spongy tissue of the lung itself and were ^{evidently} not superficial. Then the lung and heart were squared out for future investigation.)

omit paren →

13. Eyes ^{eyes} normal; no exudate

14. Skin ^{and muscles} ~~off~~ - no abrasions anywhere; the animal ^{had} not run into anything nor been struck by anything.

note

Sex ♂

Measurements (from skinned carcass; ear measurement from fresh skin)

tail 118
total 996.5
foot 334
ear 168

Sex - in ♂; testicles inside.

1
Peromyscus maniculatus
gambelii

3/9/31

Los Banos Duck Refuge, Merced Co.
Calif. about 8 P.M. (dark, starlight).
Adogen as more of these are eating
grain inside our foot trap in the
right of the flash light. One of these
was outside of the trap, on the
flat hang^{dried} mud shore and when
I approached it on foot - in the light
of the auto head lights - it took to the
water (I approached from the shore side)
and swam rapidly away toward
the middle of the slough. When it was
6 ft from shore, and still gaining
strength, I headed it off ~~from the~~ and
caught it. It seemed very little wet
except at the tips of the fur, even though
I ducked it in capturing it.

3/14/31

L. B. D. Refuge. They are certainly
abundant at this season. One mouse
nest in my car last week, and a
second one, by a different mouse
(~~1st mouse~~ let loose on other side of
refuge) this time. Also, the prunes in
my tent have been gnawed in my
absence (3/11/31) and while I was eating
lunch there today a mouse came out

Peromyscus m-gambeli 2

from behind the grub chest and
looked at me for a moment, and
then went back again.

3/20/31 L.B.D. Refuge. Mice can be seen
everywhere in front of the headlight.

3/25/31 L.B.D. Refuge. Mice continue abundant
and mouse nest found in seat cushions
left in tent during last 10 days. I found
a dead, new-born mouse on the tent
floor that had been spilled out of some
nest during "house cleaning" this evening.

3/28/31 L.B.D. Refuge by 3rd tower. Caught one
running across the flat in broad
daylight 1 P.M. The wind was
blowing hard and I think it had
been frightened out of the tent by
its flapping.

Jan 24, 1932. Alpine Creek Ranch, San Mateo Co.,
Calif. See notes under 'Weather Conditions'.
Alpine Creek Ranch for account of
cold weather. In spite of this cold
weather mice are abundant. Last
night put out 50 live wire traps
(20 in cornfield-quail inclosure section;
10 around boat house lake margin;
20 on hilltop near the top of the

Peromyscus m. gambeli 3.

ridge. I got thirty one mice plus ^{the remains} of about 6 additional individuals which had been eaten by their cage mates. The species and numbers were as follows:

While setting the traps, in the late dusk, I even saw a mouse clanking across the road near the guail measure. The cold weather does not seem to have wiped them out at all.

December 18, 1932. Mice have continued abundant ever since the above records were made. However, during the summer and early fall they have been difficult to ~~trap~~, apparently because an abundance of natural food seemed to make them uninterested in bait.

On Dec 15, 8:30 P.M. I found a baby mouse about 3 days old crawling about on my bed.

Peromyscus maniculatus 4.
gambelii

Its mother was probably the mouse which I trapped the night before (24 hours earlier). The baby was able to crawl about freely, and squeak in a monosyllabic voice. Its back was dark with tiny squinting hairs.

It fed it warm milk from an eyedropper (which was much too large to fit into its mouth), and took it to bed with her, wrapped in cotton inside an ice cream container. The next day she fed it ~~about~~ warm milk every two hours, and it stirred with noticeable avidity each time.

Dec 17 Today, its second day with us, its hair was much longer, giving the animal a markedly black appearance. That its incisors are present can be proved by the fact that it can be felt to bite freely on the end of the eye dropper, which sometimes does get inserted into the mouth, although constituting a very tiny mouthful.

The creature is now vigorous, as shown by its movements and by its squeaks which are much

Amorypus mainwetheri 5.
gambelii

louder than on the night of the 15th.

Beginning this day the milk was diluted to $\frac{1}{2}$ strength with water, following an apparent condition of constipation (which was all too successfully removed with milk of magnesia, so that today he has diarrhoea and is most itchy and restless).

His eyes are still closed, but the width of the slit seems to have increased, hinting at opening.

Sometimes when the dropper is in or up to his mouth, he will hold a little piece on each side of it:



Frequently he scratches his little chin

Peromyscus maniculatus
gambelii 6.

face with his hind foot. Twice today he gave a real sneeze when some milk got into his nose. Brian today such an accident caused him to sneeze snuffle.

Dec. 8 - Same reactions, only ~~squawk~~ stronger. After being fed he usually goes to sleep at once.

Ethel writes: after drinking a large amount of milk he lay down and washed his face thoroughly with both front feet and then scratched his head with a hind foot.

6 P.M. His feeding was mercurial, and how lustily he did squawk for it when I picked him up, and how he did pull at the eyedropper. When he had finished he squatted on all four feet instead of merely lying on his belly. This is the first time that I have seen this. He was so shaky though, at it, that he wobbled violently from side to side. As soon as I left him he went to sleep.

Dec 19, 1932. - about as yesterday. Fed about every $1\frac{1}{2}$ hours

Dec 20, 1932. Can walk, not crawl, at a staggering, but rather rapid

Peromyscus maniculatus 7
gambelii

note. Beginning about 2 P.M. today it is being fed every hour.

It very noticeably enjoys being stroked on its back - even when the stroking is against the lay of the fur - with a water color brush, as evinced by the fact that it would always stop its crawling about and would lie still when so stroked.

Dec. 21, 1932 Stranges, with fur much longer, reactions more pronounced.

It gave a distinct start each time that I squeaked, which is something it did not do two days ago. Its nose is evidently functioning, too, for when it walks (not crawls) about, it keeps its nose snuffing about as though testing the way. It realizes, too, when it is not safe to proceed further - something it did not do earlier - for when it reaches the edge of ones hand it sticks its head over only a very little way and then immediately backs up and proceeds in another direction. Its eyes are still not open, but the width of the slit seems to have increased

Peromyscus maniculatus 8
gambelii

still more. It can sometimes be seen "washing", that is to say scrubbing its face with its fore paws. It began to lick itself with its tongue, ^{licking} ~~and~~ its belly and hind legs, just as a cat does it. It now takes the tip of the eye dropper into its mouth with a precision which it did not originally show. Stroking its face and ears with the soft watercolor brush after being about the scratching reaction with the hind leg.

Dec 22 Would not drink its milk from the usual pipette when the milk was cold, even though he was very hungry. He tried to burrow down into E's hand, using both fore legs the way a dog digs into the dirt.

See P. 10
from addenda
4

Dec 23. His eyes opened between 9:30 A.M. and 11:15 A.M.

Dec 24. In the afternoon he nibbled a very small bit from a piece of bread, this being his first solid food.

Increasing activity noted by E. as follows: "Before this, many times, I have put him out onto a clear area

Peromyscus maniculatus ⁹
gambelii

as a table or a floor), and he has simply acted bewildered. But tonight when I put him onto a rug he sniffed about in an alert manner and then began to explore here and there. His eyes were still only about 1 mm. open (not at all wide), but he would run first in one direction and then in another, sniffing here and there. He was not yet very strong, so that he would wobble and sway some, but even so, he would dash about in a lively fashion.

Finally he found a burned match stick and began to gnaw upon it, so vigorously that one could hear him from two feet away. He then picked it up from the floor, but dropped it again and chewed on it some more. After a little more sniffing about he found Aunt A.'s hand, crawled into it, washed himself, ~~and~~, and went to sleep.

Dec 25. "Gave him a mother's milk while he was on the floor - this was in the morning - and he picked it up and ran around with it, darting, by jerks,

Peromyscus maniculatus 10.
gambelii

first in one direction and then in another, for about a minute. After that he dropped the nut and paid no more attention to it."

"Ate several bites from a piece of brown bread. A piece of carrot he licked for a moment but did not bite with his teeth."

"About 7 P.M. he inhaled a little from both bread and carrot. Cod liver oil - about 1 drop in a cup $\frac{1}{2}$ " full of milk - fed to him from now on - only one feeding of it per day, the other feedings being straight milk."

"Eyes not wide open even yet, however he has doubled his activity and size since yesterday morning."

"10 P.M. nipped me [E.] when being fed [this is play activity, undoubtedly]. During the last 3 nights (and tonight) ^{and also subsequently} he has not been fed between 10 P.M. and 8 A.M. He is noticeably thinner in the morning as compared with 10 P.M., the night before, however."

addenda. Dec 22 "He washes himself now, first licking his forepaws and then scrubbing his nose, eyes, ^{and} forehead. One can see the little shiny damp spot



Peromyscus maniculatus "

gambelii

both paws used
simultaneously

made on his feet where his paws
Deg 27 which have just been licked, touch it; "
Dec 29 see p. 12

"The face washing has evolved and developed, although it must be regarded as primitive. He now scrubs the whole top of his head, including back of his ears, and the ears themselves. A characteristic, unchanging, sequence is observed in this washing process. First, as of old, he manifests both face paws, licking first one and then the other and then he scrubs on each side of his nose, working from the back forward on each stroke, and starting each stroke a little farther back than the preceding one. Every now and then he manifests his paws with his tongue again. In a fraction of a second he has washed as far back as beyond (posterior to) his eyes. Here he may stop, but after he will include the ear washing process too. In this latter event he reaches both front paws way up behind his neck, and brings them down over his head with great vigor

Peromyscus maniculatus
gambelii

12.

and rapidity, momentarily flattening his ears ~~the wrong~~ direction as the paws pass over them. Generally two strokes over the ears, each stroke being executed simultaneously by both paws) suffice, and where this is done the toilet is at an end. The whole washing process hardly takes more than two seconds, and is carried on with extra ordinary vigour and celerity. The total process, as can be seen, has been developed only gradually.

Dec. 27 " Enjoys having his neck, at the side, gently scratched, just as a cat enjoys this process. When his neck is scratched in this way he will turn his head on one side so as to better expose the scratched surface, and will shut his eyes, assuming the same facial expression that a dog does when it is being scratched at that place."

"He shows recognition of his box, by smell. This is shown by the way in which he hastily scrambles into it (having first sniffed several

Peromyscus maniculatus
gambelii

13.

times) after having been loose on a table or floor for a short time."

"When possible (that is, when the box is unencumbered) he leaves it to wobble."

Dec 30 "Another play activity, namely gnawing, has commenced today. He chewed a hole $1'' \times \frac{3}{4}''$ in the paper napkin which formed his bed; also he gnawed at the edges of the small hole cut for ventilation in the stiff cardboard nest box until he had enlarged it enough to squeeze through. He also gnawed at my hand (E.T.S. & J.), while he was curled up in it, hard enough to feel distinctly uncomfortable."

Dec 31 Has been nibbling at pies of rolled oats, and at fruit cake since yesterday. The fruit cake in particular has attracted him, even when he would eat nothing else. Today when given the hard seeds of teazel (*Dipsacus fullorum*) he held them in his paws, and chewed on them until the thick outer husks were shredded away; however he did not succeed in at the kernel inside, as he tired of the work too soon. It was noticeable

Peromyscus maniculatus 14.
gambelii

that when given the oats, fruit cake, or seeds - starting on yesterday - he would not eat them while he was sitting on one's open hand, or on any other exposed surface. Instead, he shoves by his mouth rummaging about with the food inside (out of sight) his mouth that he craved privacy. As soon as the hand was closed about him, covering and concealing him, he would begin to eat.

Jan 1, 1933.

Must be about weaning time, for he quickly tires of milk after a few seconds. at each feeding now. Fruit cake still holds more charms than any other food, rolled oats next, lettuce next. He nibbles at the kernels of sunflower seeds if the husks have been removed from them. He never bites very long on a kernel, but he does get something from it.

His fur is now long and soft, and he looks like a real mouse. However, he is hardly at the stage when he would be leaving the nest except momentarily, for he gets cold when

Peromyscus maniculatus
gambelii

15.

out of his box (which is kept by the fire) more than a few minutes, unless he is kept warm in one's hand.

Made 10 feces within about one minute this morning when taken out of his box to be fed. The rather large mounds at one time seems to be characteristic of his metabolic functioning.

Jan 4. Ate some green peas.

Jan 5. Likes peas, very evidently. He is as tame as ever, that is, he runs about on ones hand without fear, but he shows the high strung nature of his bodily organism by jumping (that is, "starting") at many sharp sounds such as rustling papers, my squeaking, and ^{other} such noises. He looks very alert now. His eyes bulge in normal fashion, his ears stand up (they have done this for about a week), and he runs and darts about in lively fashion, smelling (as one can see by the way his nose and whiskers quiver) at all things

*Peromyscus maniculatus*¹⁶.
Gambelii

new to him.

Jan 7. Has been indulgingⁱⁿ the gnawing habit, a play reaction, make and gnaw. He starts nibbling at my thumb almost every time that I put it in to him; however, his teeth are not yet able to do it any damage, it seems. He ate a piece of apple, larger in diam. than a 25¢ piece and much thicker, during the night. Heant had milk for about 24 hrs.

Jan 8. Ate another piece of apple about the same size as the above. He takes milk, a few sips, about once a day now. He has chewed up the paper in his nest box, and kneaded it about until it has a fairly globular shape, with a hole in the center for him to hide in. The box is so large that he probably cannot shape the nest any better than he does.

Jan. 19. He now receives milk only once every day or two, and subsists on scratch feed, and whatever bits of



Peromyscus maniculatus
gambelii

17.

bread, vegetable, or cheese we happen to have for him. The tendency to bite has become ~~stranger~~. Usually it is but a tentative, inquiring nibble, but sometimes he will give a little nuch at ones fingers, accompanied sometimes by a squeak, and give a hard little nip, as though motivated by ill temper. In consequence of this seeming ill temper - the cause of which we are not at all certain - we have left him to himself in his box, and only rarely take him up onto our hands. Sometimes he will give a vicious (?) bite at a match if we try to strike him with it, too.

In spite of our letting him alone for the most part he still responds when E. calls to him and takes his box, bringing food. He will invariably come to an opening in the material which make his straggling nest and thrust out, cautiously, the tip of his nose. If all seems well he will extend the rest of his head out, nose pointed up at E., sniffing inquisitively.

Peromyscus maniculatus
gambelii

18.

Although starting back at any sharp sound or sudden movement, if not too scared he will usually come wholly forth in response to E's continued calling, often standing upon his hind legs and sniffing up at her eagerly. The call that she gives, or the tapping of her fingers on the box, or even the removing of the cover of the box, thereby admitting light, are ~~each~~ enough, each by itself, to elicit this response from him, as we have ascertained by experiment.

January 27. No one has been near him for about three days, and today it was discovered that he had scrambled up the smooth, perpendicular, 12 inch walls of his carton (corrugated paper box) and escaped. I put a

Debuson trap in the dining room and within 4-5 hours found him inside of it. We put him back into his box, covering it with a thick bundle of news papers.

Jan 28. One more he got out, squeezing

between the newspapers and the edges of the box, gnawing a little opening at that point, through which he squeezed. He must have ~~clung~~ clung to the smooth sides of the box by pushing his fore paws over the edge during the gnawing process.

Setting the trap again I caught him in a few hours, as before.

January 29. He has now the aspect of an entirely normal, active, immature (gray pelage) mouse. Although not very much afraid of being handled, he is very sensitive to sudden sharp sounds or motions, jumping and scurrying away from them. It is only by chasing him about in his box that we are able to get hold of him. Once in our hands he shows no fear, particularly if we close both hands over him so that he is in a cage-like shelter. ~~When~~ ^{After} he got loose this last time, and I had got him again with the trap, he jumped out of it while I had the lid open, and got away again. We had to

20.

Peromyscus gambelii.

chase him all around three rooms, ^{for 15 min.} before we finally got him again. Even then, when captured at last, he showed no great fear when in our hands.

Feb. 6, 1933. He is still timid about coming out of his nest when we are around, but when E. comes with an eye-dropper of milk, and calls him, ~~thrusting~~ the dropper through the bars of the cage, he comes half out of his paper lair and drinks. He receives no other liquid, although apple, sliced, is kept before him nearly all the time, or else lettuce, or cabbage. When we are in the next room and the light is out in the room where he is, we can hear the wheel inside his cage going at a rapid rate.

Feb. 10, 1933 - His habit of coming out of his paper retreat and sniffing for food when E. enters the room, calling, was particularly noticeable tonight. He came out while E. was still feet away. He munched the lettuce which she brought, without retreating back into the papers, thereby showing more tameness than usual.

Peromyscus m. gambelii ^{21.}

Feb. 13. He uses the little wheel regularly to run in after dark, spinning it at a rapid rate, so that it hums. With it there is no danger of his getting too little exercise, rather the reverse (see F.B.S.'s work). Due to the fact that he is kept in a heated room, plus the circumstance that he runs so much, he shows a marked thirst, even though sweet potatoes, apples, lettuce, and other moist substances are given him. The automatic water fountain has not been working well, and when I re-fill it twice a day, he drinks at it quite frantically, sometimes for nearly a minute uninterruptedly. The milk feeding has been discontinued.

The mouse shows a strong disinclination to run in his wheel when there is any ^{direct} illumination on his cage, in fact I can always stop him ^{permanently} by turning on the light, even when I do not appear in the room. He has recently got so that he will run in the wheel if persons are standing near so long as they keep fairly quiet (as to

motion; talking makes no great difference), but if a flash light is turned on him he will stop immediately, even though the beam may be weak. Only once or twice. Only once, just for a moment, last night, did he run in the wheel when the lamp was on, this being the first time he has ever done this.

March 7, 1933. Slightly more ready to run in the wheel when the light is on, but still reluctant to do so for more than an instant. When given salted ^{roasted} peanuts, with the buzzer running - wheel still on, he took them one by one from E's fingers (through the cage bars), and ran with them, one at a time, in under his little nest or tent of newspapers, where he scratched a little hole in the saw dust and deposited them. After putting each nut there he would return for the next. Did not observe that he carried them up very carefully after placing them in the saw dust; some

Peromyscus gambelii 23.

did not get covered at all, others seemingly only by accident as he moved about.

April 11, 1933 although we have not fed him any milk since the water fountain was put into his cage (see entry), he swallowed it eagerly from an eye dropper this evening, just as he used to when a baby (He is now full grown as to stature, although still in the immature pelage). He always comes out of his lair and snuffs eagerly when Ethel comes with food and calls him, but this she has been doing continuously (except when she is away) since his baby days.

April 13, 1933. Came out in the day time (10:30 A.M.) when Ethel called him - an unusual circumstance - and took some more milk from an eye dropper, the milk being condensed milk. He takes condensed milk either straight, diluted with water, or diluted with milk.

May 10, 1933. Gets fed his milk every

insect trying to fly in a very tiny space. Seizing the flash light, I chased this incautious youngster behind a box, slammed the box against the wall, to squash him.

The noise, uncannily, continued in spite of my noisy poundings.

Resuming the box I caught a glimpse of the clatterer *rr-r-r-r-r* or crouched in a protecting chink, unharmed. He darted away; I killed him a moment later. His signal must have been audible to any other mice for many feet in the silent night.

Jan. 15, 1934. Alp Cr. Ranch. Mice have repeatedly knocked a 10¢ cake of white hard soap (not Ivory) off the wash stand outside, and have nibbled a total of several grams off its edges, which are heavily scored with their tooth marks. The mice must have spent, in all, many hours at this nibbling.

- 1
- Procyon
- 2/16/30. Marysville Buttes, Sutter Co. Calif.
North exposure of West Butte.
Numerous foot prints along muddy
stream bank.
- 3/19/30. Quejito Ranch, San Diego Co. Calif. S.W. end of
Ranch. Tracks pretty large and very numerous
along wooded stream and even out away
from the canyon on grassy hill side where
the canyon paralleled the canyon, 20 ft
from trees.
- 5/28/30. Los Banos Game Refuge. Tracks very
numerous along the muddy margins of
nearly all of the sloughs. Animals appears
to be common. Faeces supposed to be
coon (Cheney) along east side Ruth Lake.
- 5/29/30. Same as above. Island "I" at upper end
Mud Slough. - Small Island with remains
of 1 Ruddy, 1 Mallard and eggs ^{shells} of some
duck lying scattered. The 2 birds had
been eaten. Faeces of a coon in a pile
near 1 of the birds. (saved)
- 3/1/31. L.B. D. Refuge, vicinity of Olson
Pond. Fresh tracks (night before) followed
by Mc Cake as they went along the
shore line of various flood waters
for a half mile or so. This country

2
Procyon

is about $\frac{1}{2}$ mile to 1 mile from
the willow bottom of mud slough,
and there is no cover at all in
these places.

8/22/31

Oak Ranch, Gordon Valley, Napa Co., Calif.
Quail Station No 2 (Cypress water trough). Foot prints of a
coon in the muddy bottoms of the trough,
which is practically dry. Also on a cow path
leading past the place.

8/29/31

Alpine Creek Ranch, San Mateo Co., Calif..
Dried up "lake" by foot house. Foot prints around
the diminishing puddle of water in the center of the
lake. They were not very fresh tracks, however.

May 13, 1932. Alp. Co. Ranch; main road, opposite
the quail experimental grounds. Saw
the foot prints of a full grown
coon, marching down the dusty
road for a distance of thirty feet
or so.

Dec 1, 1932. Alp Co. R. I have continued to see
tracks during the summer. Mr. Passen,
your foreman of the Ranch, says that
he saw one for a moment in
front of the swimming pool, as he
was driving by at night with his
car.

Dec 20, 1932. Alp. Co. R. ab. 100 yds up the road

Amoryon

3

from the main gate; 6:30 P.M.
dark. A coon ran down the road
75 feet or more, in front of my
headlights, before running off the
road into the brush. He looked like
a big one, all right.

Feb. 14, 1933 Alpine Creek Ranch. Mr. Bill
Edmonds, lion hunter who has
been up at Ralphs for a few days,
unsuccessfully trying to get the much-
talked of lion, got a coon this
afternoon; tracked its course (of last
night) to a large, hollow trunked
live oak. He says that although
coons will choose such hollow trees
for spending the day (this one was
open at both top and bottom), they
use less drafty situations for
raising their young.

He had already thrown away
the stomach, but said that in all
probability it would have contained
mammalian berries or acorns at
this time of year.

Sept. 5, 1934 Summer Ranch (NE. 1/4 Sec. 17 Twp. 7S,
R 3W), San Mateo Co., Calif. For at least
1 1/2 hours this morning I heard over

dog barking at one point in the brush 150 ft from the garage. At last I went up and found that she was barking at a young coon which was on the ground among the buckeyes, ferns, and poison oak. Strangely enough the little animal made no effort to climb the buckeyes either to escape the dog or me. He seemed sluggish and dazed (although not touched by the dog or in any other way injured as far as I could see) and at my approach merely ran haltingly under a tangled mat of poison oak. When I pursued him further he crawled into a woodrats nest, ~~thrusting~~^{wedging} his head in among the sticks, which only resulted in his trapping himself and falling into my clutches. Upon being picked up (one hand around his neck the other grasping his hind legs) he struggled weakly and ineffectually, tried unsuccessfully to bite, and emitted at intervals a falsetto, infantile snarl. He was $\frac{1}{2}$ grown or less, and still had his milk dentition. No real ferocity was shown in any of his actions.

Sept 6. Same coon. So little disposed to savagery is the little coon that already I can stroke his back and pet his head provided I move my hand toward him slowly, and keep it away from his jaws. When I touch him like this he puffs and blares with frightened menace but does not growl or snarl. Instead he hunches down in a corner, making himself as small as possible and suffers my attentions with frightened but not too hostile defiance. He drinks milk readily, but does not come for sardines, only one out of a saucer full was taken.

Sept 7. Today I put on leather gloves and picked my little coon up. He growled a little, puffed and blew considerably, and nipped slightly, but offered no serious resistance. In sleeping he crouches like a mouse in similar conditions, sitting on his hind feet with head tucked forward and under, so that his nose is pressed against his belly; the tail lies on the ground, curled sidewise and forward to the nose:



← ~~the~~ dorsal view

Sept 10. At first he would eat nothing but ^{raw eggs and} milk, having refused all ~~of~~ sandwiches after the first one. Recently, however, I have added canned corn to the milk, and this he eats although he always leaves some. Raw eggs are very acceptable.

After dark he becomes active, but in the day time he remains curled up, invisible in his barrel, which is in a large wire cage in front of the house. During the evening as he runs about, he frequently utters a low, chuckling kind note as though calling to others of his kind - although impossible to adequately describe it may be referred to as ~~a~~ ^{sort of} liquid, rather high pitched chirping kuk, kuk, kuk, kuk, kuk.

November. Unfortunately I have had no time to cultivate my coon's company and only approach him to feed him, however ~~he~~ ^{sometimes} is somewhat less shy even so, allowing one to approach him with a flashlight, especially if he has not yet been fed. He has seemed to grow tired of corn, and steadily refuses ^{canned} fish of all kinds.

However, I have succeeded in getting him to eat canned dog food regularly and in large quantities by introducing it in gradually increasing amounts, at first mixed with milk and raw egg. But later mixed just with milk.

January. Ethel has been feeding the coon lately and has given more time to him at the evening feeding hour than I have been able to do. Accordingly, he has become noticeably tamer, no longer scuttling into his barrel in the evening when one passes by with a flashlight, and even ^{giving} taking bits of food from Ethel's fingers. He eats apples readily.

February 26th. Being busier than ever, I turned the coon loose on the rocky little knoll 50 ft. from the house. He scuttled off, with awkward hump backed gait, looking sidewise at me as he went, and making for the clump of brush. I was able to interrupt him with ease and herd him about at will. Presently he began to lose his timidity, and would poke his

Procyon

8.

nose into little holes beneath stones, exploring and sniffing. So long as I did not come closer than 15 ft. he was content to merely keep a bushy ^{small} pile of rocks, on the trunk of a small elderberry between him and me; closer approach would cause him to scuttle into the brush. While he scratched in the dirt with his forepaw, digging up tiny fragments of something (what I don't know) and stuffing them into his mouth, both hands at a time, I took several photos of him, then, being very busy indeed, I left him still prowling about; this was about 1 P.M., bright sun light.

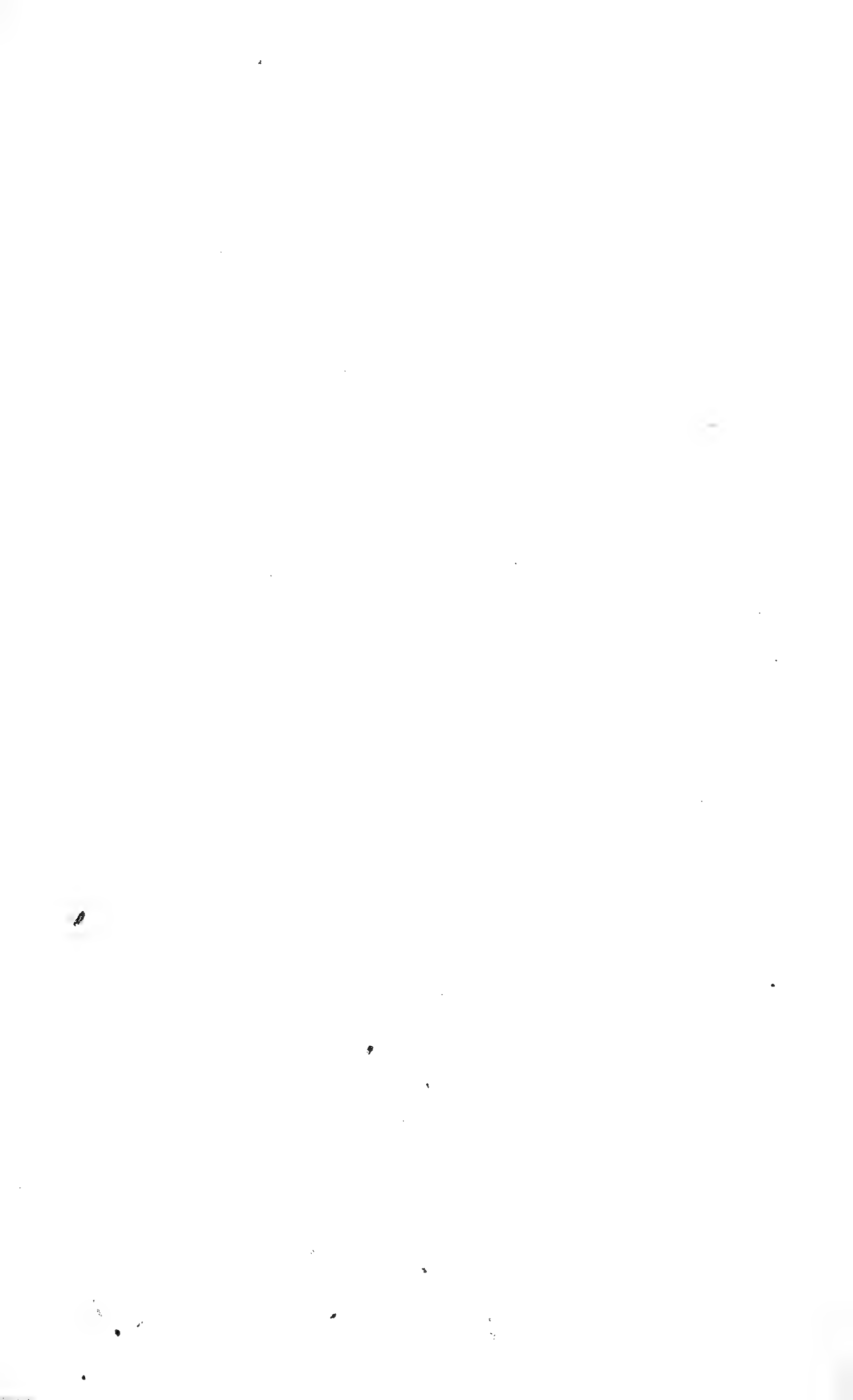
Photo

Reithro duntomys

3/2/31

Los Banos Duck Refuge, Los Banos,
Merced Co. Calif. By Holt's place. One
seen about 3 P.M. (Sunlight) in grass. It
tried to hide in a little crevice of moist
earth at the base of a perpendicular bank,
but was not successful in concealing
itself on account of the small space for
concealment (see photos). No amount
of walking about, shifting the tail
to avoid shadow, etc. served to make
it run once it was established there,
(Positive thigmotaxis?) although it
"jumped" at every sharp noise made.

(+ 3 thin ones)



Sciurus griseus

1.

July 19, 1932. Estate of Andrew Welch, San Mateo, Calif. The following are notes which I ought to have recorded long ago.

Environment of Welch Estate -

Calif. Laurel, live oak, (both species exceptionally venerable trees) redwoods (artificially planted grove), artificial vines shrubs, in profusion, the whole constituting a jungle of vegetation, exceptionally shady and cool, almost (or quite) transition in character as regards temperature conditions.

About May 15 complaint was received by the Div. of F & G. that the squirrels on the place were killing the tops of the redwoods in the grove by ^{off strips of} gnawing the bark until it was girdled. This was true, as I found from personal examination; the trees were gnawed about 4-6 ft from the top, where they were 1 1/2" to 3" thick. Eventually they died

glaze this mark and the top broke off during high winds, the tree, of course, remaining permanently disfigured. The Div. of F. & G. received an identical complaint from someone in vicinity of Santa Rosa.

In addition to this damage the squirrels ^{entirely} on one day stripped the bark off several pieces of rustic furniture on the porch of a "summer house" on the Welch Estate. It may be that they were using this bark to line their nests at that time in process of construction; perhaps the bark near the tops of the trees was more tender than that below.

I trapped ~~to~~ about 28 squirrels (to date) by the following method:

1st week - put out prunes daily on horizontal boards (8" x 24") fastened to tree trunks or fence tops along their principal travel ways. The squirrels during the week formed the habit of coming to these boards to

Sciurus griseus

3.

feed.

2nd week. Placed the open-mine (manufactured) traps on top of these boards, in set, the prunes being renewed inside trap, same position on board, daily, as before.

3^d. week - set traps, began catching squirrels at the rate of about two per day for the next ten days. Every time it was not convenient to trap, the trap doors were wired open and the prunes renewed as usual. This was done two or three times during three weeks, and clauettes helped to keep the surviving population un suspicious.

Only 3 ♀s were caught among the first 12, the rest being ad. ♂s. So clauettes this was because the ♀s were in the nests with young (for exact dates on this, find out when I caught the Bps. of quail. It was about 10 days after this

Sciurus griseus

4.

that I caught the 1st 12
squirrels). Some but not all,
of the ♂s had the testes conspicuously
enlarged; the others had testes
nearly invisible (that is internally
situated, I guess). The ♀s had
mammary prominent. A
newly constructed nest was
shown to me. It was about
50 ft up in a large bay tree
(Calif. Laurel), being placed nearly
at the end of a slender nearly-
horizontal branch. Its outside
diam. was about 16" and
it was made of sticks and
leaves, apparently. Other
older nests were shown to
me, one in same bay
tree having four in it.
The squirrels cause additional
damage by digging in the
numerous flower pots full
of sand, which are placed
by dozens in shady places
around the garden edge. These
pots contain young plants,
and the squirrels seem to

Sciurus griseus.

dig these up and (I guess) eat the roots. The squirrels also dig in the sand at the bases of the Calif. Laurel trees, searching for the roots of the Laurel, which they also bury there themselves. Perhaps this is the reason for their digging in the planer pot sand also.

Once I saw a squirrel lying stretched on its stomach, head turned to one side so that one cheek was down, on top of a fence which constitutes a main travel way of theirs. It was basking in the sun in just about the position a person would assume when lying down. The fence board was only about 1" wide.

June 17. Young squirrels suddenly began to appear at this date, as shown by catching 5 or 6 in the traps. They are only about $\frac{3}{5}$ - $\frac{3}{4}$ grown.

Squirrels which are cornered, and also squirrels that are sick, often usually crouch

Sciurus griseus

6.

down with the head held low
and the tail held flat ~~over~~^{along} the
back so that its tip extends down
over the face - thus:

in this position the animal
peers out through the hair of its
tail.



July 9- Squirrels drum on the
floor of their cages in the
same fashion that mice do.



Sciurus niger
rufiventris?

1.

June 8, 1936 - New La Honda (paved)
road, $1\frac{1}{2}$ mi. from the Skyline
Blvd, between the Skyline Blvd. and
Woodside, San Mateo Co., Calif (Santa
Cruz Mts., elev. about 1,000 ft).

Found a ♂ of this species lying
in the road, crushed by an auto-
mobile, evidently early in the
morning. This is the first
fox squirrel I have ever seen
in the region, although they were
introduced into the valley - 6 miles
away, airline, and 1000 ft. lower -
several years ago (probably 10
yrs, as I heard about it 5 yrs. ago
myself).

The country where I found the
specimen is heavily wooded -
dense stands of redwood in the
canyons; live oak, madrone, elder
berry, Ceanothus on the slopes;
also parson oak and some
Baccharis. Specimen given to
the M.V.Z.

Spilogale

3/26/31 Los Banos Duck Refuge, Los Banos,
Merced Co. California, by the shacks.
An individual had been ~~to~~ taking the eggs
of the nesting semi-domesticated mallard
from out of the duck pen by the
shacks, for several nights. It would
remove 1 or 2 eggs out of the set and
no more, and bite a large hole
in one end, removing the contents in
this way. On 3/25/31 a steel trap
was set by the cook and got him
that night.

3/28/31 L.B.D. Refuge by "Redtail Camp" (just
made, see Butte 3/29/31). Smelled a
skunk suddenly about 10 P.M. Might
have been *Myiurus* or this species.

5/13/31 L.B.D. R. 1/4 mi E. of 2nd Butte
Camp. As I was driving by at
8:15 P.M. (dark) I saw an old ♀ with
one young on the road in front of
the head lights. The ♀ was crossing
the road diagonally with her young
one, as though taking it somewhere
— perhaps from their home to another
burrow. It was perfectly flat and
open for several hundred feet in

photos



Sputogale 2.

nearly all directions) since it had
rained hard for about two hours
that afternoon. When I approached
with the 1200 ft. flashlight she
quickered her steps and doubling the
young one which was at her heels,
I caught him by the skin of his
back - about at the middle. If I
came too close (10 ft) she would
drop the young one and point her
hind quarters at me threateningly
for a moment, then pick him
up again and hurry on. At
last I picked up a handful of
dirt and hit her with it, whereat
she dropped the youngster, and
ran off even faster, urging him
into the darkness. I threw my
sweater of the latter and picked
him up - in spite of a
slight odor from his tail scent
glands - and put him in a
box over night. The O. I chased
around some more with the
light (she seemed quite bewildered
and "let off steam" on twice, and
then paid no more attention to her.

Sputogale 3.

5/14/31 Same youngshu as above. He must have been hungry after his rights fast for he continually made a little chirping noise while in the box. When I opened the cover he did not shoot but did put himself on the defensive - tail laid flat over back and hind quarters pointing at me; at times, his acquiescence with my motions along the box, he would advance and retreat, stamping now with one front foot and now with both front feet together in characteristic spilo fashion. He also made some noise with his hind feet as he walked, but not so much. I put him to a "stake" took photos (he chirped a great deal) cut off the 3d digit from each front foot, and let him go near where he was caught last night. Shunk-like, when let down. He raised about and stood still instead of rushing away to safety (or perhaps it was because he was tiny and bewildered).

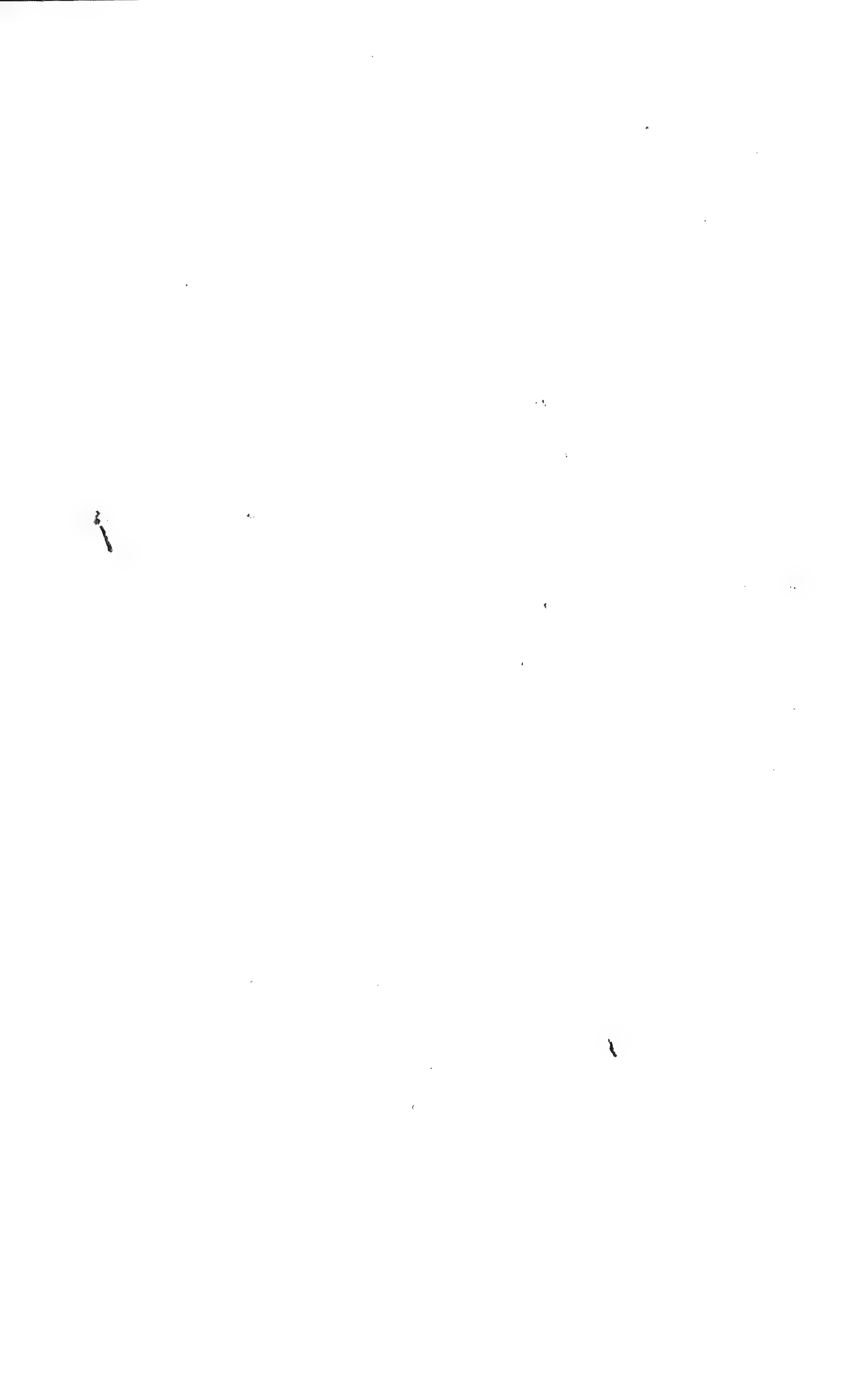
shed) →



Spilogale

4.

6/8/31 L.B. DQ 1/2 mi e. 2B-camp. A
half to 3/5 grown young dead
in the road; was not there last
night. Mc Lellan says he and his
dog have not been by at all.
What could have done it? Rough
dissection showed that (although decomposed)
injuries were confined to the back in
the region of the shoulders; large and
extensive blood clot was present at
this point and one hole about the
size of a fork tine - just as
though a coyote and picked him
up and shaken him once, and one
of the teeth had pierced the skin.
If it had been a bird of prey there
ought to have been more holes, and
also a place at the base of the
skull which there was not.
This is only about 100 yds
from spot where the little
skunk was liberated, but this is
not he as proved by presence of
all fur intact. A minor clot
present in region of frontal bones.



7/8/30

Sylvilagus

Las Bajas Game Refuge, Calif. 2 seen in afternoon, east of Mud Slough; both tame and could have been easily shot.

7/9/30

One seen same place as before - very tame. I found it in a small depression in the ground from which there was no escape. It started past my feet, but on escaping stopped running at 20 ft distance and looked at me, then slowly walked off.

7/10/30.

L.B. G. Refuge - Squirrel burrow about 15 ft from water line. Heard cries of rabbit in distress, looked in burrow and could see rabbit's head 4 ft back, eye blinking, rabbit still crying. Dug for few minutes and saw part of snake. Dug 15 minutes and unearthed large gopher snake. Although the snake could be seen swallowing part of the rabbit while we were digging it had disgorged that part when we finally got them out and was wrapped very tightly around the now dead rabbit. Snake very vicious, hissing and lunging. We put snake and rabbit back into burrow. Rabbit's whole head covered with saliva. Rabbit was adult.

Two more cotton tails jumped out of

Sylviolagus

2

2/22/31

entrances to burrows in A.M. like those of previous day they were very tame. L.B.D. Ref. 7:50 A.M. One seen sitting on a flat place 5 1/2 feet up in a twisted, hollowed willow stub. When I approached to within 10 ft it crawled down into a hollow in the stub. (Willow is still alive in part).

Later in day, by three-legged tower. 2 rabbits at openings of adjacent burrows. Both continually shook their heads because numbers of small gnats were hovering about and attempting to settle on their ears. Every time a gnat tried to alight the rabbit would shake its head.

2/23/31

Rabbit mentioned above seen in tree at same place again today 11:05 A.M. 3 P.M. Same rabbit seen again only this time at the base of the stump. When I approached it scrambled up inside the hollow trunk. This retreat is on the muddy margin of a slough about 10 feet from the grassy bank which marks the edge of the

green flats.

Same day, same place, 5 P.M.,
 camera in place since 3 P.M. (about
 8 photos). Rabbit in accustomed
 place on curved bank. I snapped
 one picture at long dist. with
 shutter then walked slowly up to
 camera and took remaining 7 photos
 standing right by camera in
 open only 15 ft from rabbit.
 At my first approach, he moved
 one step toward cavity although
 to go down but I stopped, and
 worked the camera with very
 little noise and motion. In
 a minute or two he settled
 back in his original position and
 remained so throughout all the
 pictures except one or two
 when I made him take up
 position of repeating toward cavity
 — momentarily! — by waving
 my arms. He soon settled back
 again. However when I stopped
 waving and was still on his
 bench when we left, 15 min.
 after 1st arrival.

Sylvilagus

2/28/31 Same rabbit same place. Although I visited the stump in early morning and again in the evening the rabbit was not to be seen. Since the two Rabbits living n. of the m. e. and w. rd were flushed out of an adjacent tree this morning I feared that they might have caught the rabbit. However:

3/1/31 8 A.M. (Bright warm sun). Rabbit started up from edge of grassy flat 20 ft from base of stump and ran to within 2 ft of its base, where he stopped - with me only 20 ft. away and just getting out of the car. While I stood there he hopped deliberately to the back or water side of the stump, ran up into its hollow and emerged at the "top" on the flat limb where I have hitherto found him.

3/7/31 Same rabbit (?) 75 ft away. There is another, more nearly prostrate, willow stump 75 ft from 1st tree and at 2 P.M. - This rabbit was frightened from the green grassy bank and took refuge there. This trunk is much more nearly prostrate

than the others, with dirt and wood
sown in the crevices half way up and
the still-living shoots are much
thicker so that they form a dense
screen over most of the stubs.

3/9/31

This same habit of taking refuge in
trees seen in case of ~~2 other rabbits~~ on
Kaufmann ranch, just n. of L.B.D.
Refuge.

3/14/31

Tree-living rabbit described above inside
Refuge: There are at least two in
this vicinity; this P.M. One took to
one tree, one to the other, more slender,
tree, and one ran on down the bank
75 yds

3/16/31

Mud Slough by pond. Rabbit caught
in box trap baited with fish for
skunk. It may have gone in because
of possible traces of oil of cummin seed
put in there about 4 months ago,
but more likely it went in because
of the appearance of a safe retreat. The
fish seemed to be untouched. I put a
large gopher snake into the box
later in the P.M. and left both
together overnight.

Next P.M. Both in healthy condition
so let rabbit go after clipping right ear.

Synhylaes 6.

3/20/31, L.B.D. Refuge vicinity Mud
Slough - after dark - maldits very
numerous, there being sometimes as
many as 3 in the narrow radius of
the Ford headlights at one time. They
are never very wild and to night,
they seemed bewildered, or at least
uncertain what to do, in the presence
of the lights. We nearly ran over
several which made no effort to
get out of the way as we approached
but simply hopped about slowly
with noses near to the ground or else
raised up on their shoulders and looked
about. Once when one stopped
directly in front of the car I
stopped, got out, and walked after
it while holding the flashlight
upon it. By doing this I could get
within 2-3 ft - the maldit, of
course, being unable to see me
on account of the glare and being
guided in its retreating movements
by sound. When I got close enough
to almost reach it it would dodge, and
after this had happened several times
it began to run. I followed, and

was obliged to run at top speed most of the time to keep up. This continued for 3 or 4 minutes; once the mallet came to a "slough" and splashed in to a distance of about 2 ft from shore; I was at the shore by then ~~and~~ ^{but} instead of crossing the slough, hardly more than a 6 ft puddle, it turned and half ran half swam parallel to shore for 4 ft or more, then came out on land and lodged about some more. It never got very far from where we had first started, and in its turnings passed under the Ford twice (L. being parked); each time it ran blindly into the rear tire as it passed. One or twice it would leap about 3 ft into the air as though startled - much as a horse would shy - and then bound off at its usual speed. At last after about 5 minutes chasing it splashed across another little pool and ran too fast for me. Shortly after this another mallet was pursued in the same manner and behaved in the same way except that he never got so frightened.

Syllology &

that he ran about blindly as the others had done. Most of the time in fact I was able to keep up with him. By walking slowly and about 10 times was on the point reaching down and picking him up when he would jump a little to one side or move ahead. This habit kept in a fairly straight line by judicious "driving" behind him with the flash light and we traversed nearly 1/4 mile of flat open country. At last he came upon a small hole; but here again the native slowness of reaction, or lack of fear or whatever it is, which all these Refuge cotton tails exhibit, was illustrated; he lowered his head and peered ^{down} into the hole, then slowly started into it - and at that moment I grabbed him. He made no sound and I put him in a sack and left him over night.

Another habit about 7 inches long - a very young one - seen running away from the headlights. I chased it with the flash light but it got into some dense weeds in the bottom of a gully and could not be found.

True he
appeared for a
moment
an attempt
to rise in some
little mound
of dirt over
him,

3/21/31 L. B. D. Ref. Rabbit mentioned above found to have large scale-covered areas on shoulders and on lips, although seemingly vigorous enough (while in the sack last night it kicked and leaped about enough to bounce out of the rear compartment of the Ford, door closed and sack on floor, not seat, and make its way to a distance of 35 feet by morning. Kept in captivity all today in order to send up to Hooper Foundation later.

7:30 P.M. e. side Mud Slough:
A baby rabbit about 5" long found wandering in the dry furrows by the side of the road. It was too young to run away and offered no active resistance when picked up. When we tried to feed it cows milk diluted $\frac{1}{2}$ with H₂O + a pinch of sugar, it made no effort to swallow, so that the milk all ran out. It was kept over night too.

3/22/31 Baby rabbit mentioned above still refuses to take food, so after three photos it was released where first found. Making it lie still for the pictures

photos

was easier than anticipated; it would hold for concealment every few moments if not held, but pictures could be snapped immediately after they had been set down without much trouble, the only drawback being that these show the ears lying back, since the rabbit only raised them to an alert upright position at the moment of making his escape reactions.

Adult rabbit with seals, mentioned above, taken home.

3/23/31 Adult rabbit just mentioned is apparently as tame as a ~~captive~~ domestic rabbit already. It does not move away while in its cage when I approach, and although appearing healthy can even be touched through the wire without exhibiting fear. In contrast is the behavior of the ground squirrel (see Citters this same date) 7:30 p.m.

3/27/31 L.B. Q. Refuse. It has been sprinkling lightly, with the sky overcast, for 1 1/2 hours, and when I went over the same ground where I had been 3/1/31 (when I caught the ad. rabbit) instead of seeing 15-20 rabbits I saw only two.

Sylvilagus

3/28/31 L.B.D. Refuge. Rabbit photographed and cited as living in a willow on earlier pages seen in ^{same} tree today at 12:45 P.M. in usual place.

4/4/31 Saw another very small rabbit by main M.S. bridge about 5 P.M. in bright sunlight. He nervously crouched down with ears flattened as we drove by. About 8 feet away was a large gopher snake but the snake was facing the other way so I think it was unaware of the rabbit.

See records of many baby rabbits under Buto for this date and earlier dates (nest contents).

4/20/31 L.B.D. Refuge by 2nd Buto camp. No wonder the predators get so many rabbits! While I was sitting here in my car by a dried up slough for 3/4 hr at 9 A.M. three rabbits, one ad and 2 young 3/4 grown, came out (at different times) and hopped about on the open mud flats and along the fringes of rushes which grow along their margin; of course when night close to the rushes they might dart back in if pursued by a hawk or owl, but when out in the middle of a flat they would fall an easy prey.

5/22/31

L. B. D. R. By 2nd Butte Camp. a cotton tail seen slowly lopeing along in broad daylight in the open, making toward a large marshy area of fresh grass. This is a common practice with them and I have seen it often. They feed on a very short, light green velvet weed which has sprung up from the dryer mud.

Cotton tails in the cage (see carnivore-mallet record). One mallet a young one, warmed its way through the bars into a neighboring compartment where another - adult - mallet, which had been taken in the same trap, a day later, was. The adult bit the young one by each shoulder and I suppose would have killed it had I not heard a lot of sniffing and thumping (no cries) and rescued it. These mallets are very "tame"; one which I had just dumped out of the gathering sack into the box, began eating lettuce leaves (it had been in the trap at least 7 hours, I guess) while I was still hammering the slab on its compartment and jarring the whole box. The young

rabbit mentioned above, when picked up by the ears, kicked vigorously but did not cry out or seem uncomfortable other than not being horizontal.

6/2/31

L.B.D. R. by Pierce (wound pump).
A nest containing 4 very small young ($4\frac{1}{2}$ "-5") found by Mr. Lellan and men under the foundation of the pump (I had previously seen a cotton-tail run up into the (then dry) water conduct pipe from this pump (it being 6"-7" in diameter). The young had their eyes open but were too small to make much effort to escape. One was killed by the dog "Dick", one crawled away further beneath the foundation. Of the two remaining one was perfectly quiet and only once tried to crawl out of the wind (which was blowing hard) while being photographed; the other burrowed into the grass several times. The men seeped out a place in the ground ~~between~~ in a corner of the foundation, lined it sparsely with grass and put these two into it - and they stayed there without trying to make off (photos). This would appear to be a second litter because

Sylvilagus

14

it is long past the time when I saw small young commonly (see earlier notes) also those earlier young are now nearly grown, as my trapping shows.

6/3/31 Nest of rabbits mentioned above. Only one youngster to be found (he was in the nest), although I looked everywhere under the structures supporting the pump and adjacent junk. This youngster has a small patch of white hairs intermingled with the brown (about size of end of lead pencil) right in the middle of his fore head; the other youngsters did not have this.

6/4/31 By new duck pen, S.W. cor. of refuse. ab. 5:30 P.M. A rabbit is feeding out on a little mound in plain grass. He is within a few bounds of a squirrel burrow if danger approaches, to be sure, but never enters he doesn't seem to keep a very sharp lookout; no wonder so many animals catch them. Rabbits - at least here - are not very wide-awake animals.

ab. 8 P.M. This rabbit has been feeding in the vicinity of the road

all this time, gradually moving further and further east and behind some weeds by another knoll until now I have lost sight of him.

at 9:45 the men with the tractor are passing by with a great noise some 250 yds away and the rabbit - foolishly, or at least not vainly - hopped from his place of concealment out across the open and down into a little hollow place (doubtless with a burrow at the bottom) in the top of another knoll, where he sits with just his ears showing - as they do so often. After a few moments he ran back into the long grass again and I saw him no more.

3:45 P.M. The breeze mentioned under Citellus II is about the dimensions of a gale already. What I take to be the same rabbit as above came out and fed for a few moments before disappearing (was watching other things so don't know from where or to where); this is another sign of cooling off.

6:25 P.M. The rabbit is out again, mostly "just sitting" by the entrances of various burrows at the different

knalls round about occasionally
~~it stretches~~ ^{like a large mammal} and then walks out onto
 a flat grassy place and feeds
 6/6/31 See Canis ochropus 16 for comparison
 of alertness of Lepus with slowness of
 Sylvilagus at approach of a coyote.
 Rabbits certainly use the early morning
 (sun light) hours for loafing and feeding.
 Before me is one which I have watched
 since 5^{pm} (now 6:25 A.M.) For the last 15 minutes
 he has just sat. See Citellus 14 for
 example of difference in alertness etc.

9/5/31 L.B.D.R. Second Butte camp.
 After an absence of a month
 and a half I found upon
 unpacking the ford that a
 cottontail had crawled down
 in under the ~~off~~ ^{up} sacking
 and canvas which were used
 to cover cot and other
 camping equipment which
 was stored in the tunnel
 of the ford. Probably this
 was an habitual ~~retreat~~ retreat
 of his. In order to get in
 he had to leap ~~up~~ ^{up} straight
 up a foot and a half
 to the running board &

Thence into the front compartment by way of the open door, from there up onto the front seat and over into the rear compartment.

May 13, 1932. Alpine Creek Ranch (Ralph Estate), San Mateo Co., Calif. By the big, old, barn. I have noticed one or two cottontails (at least they have bright white tails, and are ^{fairly pure} light colored) several times, running across the road as I drove past the old barn. I saw one one, too, near the Cat's house.

Sylvilagus bachmani bachmani

March 21,
1932.

Alpine Creek Ranch, San Mateo Co.,
Calif. (Ralph Ranch). See "Census -
Brush rabbits, chipmunks - Alpine
Creek Ranch" for data on abundance
from day to day.

I planted sunflower seeds in the
quail enclosure experiment plot, and
all those which were within ten feet
or so of any brush were nibbled
off level with the ground as fast as
they pushed their little colicledons
through the soil. I lost about 90%
of all the sun flower seeds I planted -
all that were not far out in the
open, ten or more feet from any
brush. Once I saw a rabbit out
on the bare ground nibbling on
about the region where a row of
sun flower seeds was; this was late
of a cloudy after noon. Most of their
activities in this direction must
be carried on in the evening, or
early morning, however, for I
have seen rabbits feeding in the
garden only this once.
~~Two days ago~~
~~Today~~ I put six fox traps out
around the edge of the feed patch,

Mar. 23
1932.

Sylvilagus bachmani bachmani ².

near places where the heaviest damage had been done; they were baited each with a few lettuce leaves and a handful of sun flower seeds. I also laid down a piece of stone pipe about 12 ft long, where the brush was thick (see notes on *Sylvilagus* at Los Barros).

Today the traps had not been visited by rabbits; one was sprung by a mouse (*P. californicus* sp.).

Mar 25. Today I added cummin seed oil to the trap bait - applied with a feather to the inside of the trap at the back. I added a C. F. & G. bought trap to the fleet, also, also sprayed all sun flower seeds with whale oil soap solution.

Mar 26. No traps sprung. Can't tell yet whether the whale oil soap solution is doing any good or not.

Mar 27. No rabbits caught yet.

Mar 28. Caught a rabbit today in one of the box traps. Killed it and reset the trap. Re-sprayed the sun flower seeds. The growth which they have made since the first application of the whale oil soap (Mar 25) is very marked; nearly the entire

Sylvilagus bachmani
bachmani

3.


convoluted furrow, now
shows plants - some ^{with the cotyledons} badly chewed,
of course, but none since the application
of the spray. Before the use of the
soap hardly a fourth of the lot
had managed to get their leaves
above ground intact.

Nov 30, 1932. Alp. R.R. Brush rabbits show
that they possess territory by being
found, nearly always, at about the
same place. For instance, there are
three or four, which I frequently see
on the south side of the quail
enclosure (designated as Q.I), either
running across the road, at a
particular place, when I drive
past with my car, or feeding in
the brush at the south side of
the quail feed patch. I have seen
no rabbits at other places immediately
adjacent, although brush is plentiful;
always it is at these certain places.
The same remark may be made
about another spot on the curve
of the road ^{shortly after} ~~where~~ it enters the
main front gate of the ranch.
at this place I very frequently

Syllilagus
bachmani bachmani

4.

see a rabbit cross the road and
dive into the bushes, as I drove
past, but never at any other
spot near there - at least so far.

April 9. Alp. G. Ranch. Today I saw a rabbit
run out of the old stone pipe (about
15 ft long) which I had laid down
in the brush (see contra). This
is the first time that I have
found a rabbit in it, although
I have looked every day. The
rabbit heard me coming through
the brush, and it squeezed out
the far end of the pipe which was
only imperfectly boarded
 board over end of pipe. It must
have been pretty hot inside
that pipe, for a hot sun
was shining directly upon
it (time about 10 A.M.). I have
noted cotton tails in similar
pipes at Los Barros (see my
Los Barros note book) under
conditions when it must have
been a great deal hotter, still -
illustrates the power of the instinct
to stick to a burrow-like retreat
no matter what happens, I guess.

Exit

Sylvilagus bachmani
- *bachmani*

5.

The whale oil soap is working very well. I have put on another application (possibly two), and have seen no indications of further damage since the use of the spray the very first time. The sunflowers are up in all the furrows now.

April 15, 1932

I have certainly found a way to catch rabbits at last! (My box traps, baited with currant seed oil, have been set all this time without result). For about a week I have had some quail traps out, with the doors open but baited so as to get the birds accustomed to entering the traps (see under *Gophortyx* about this time). The traps have been baited with chicken "scratch feed" plus a little millet and a little corn. ^(April 15) Wednesday I set the traps for the first time but caught no rabbits; it was raining quite steadily, which may have made them inactive. Today was sunny, and when I set the traps at

11:45 A.M.

Sylvilagus Bachmani 6.
Bachmani

I began catching rabbits immediately. The first rabbit was caught about an hour after the traps were set, and between 11:45 A.M. and 5:15 P.M. I caught four rabbits in the four traps. Other rabbits were seen close by the traps on numerous occasions, but they scampered away at my approach. One of the four traps mentioned was shifted to an entirely new place at the commencement of the period, and it attracted nothing, neither birds nor mammals; consequently it should not be considered when computing the average catch per trap, since the other three traps had been in position for a long time, allowing the animals to become used to them.

I am certainly surprised that these rabbits should be so readily attracted by grains. The bastards gnawed my quail trap top (hoppers (fish netting)) to shreds.

They skin their noses up

7.

Sylvilagus bachmani
bachmani

rather badly on the trap wires.

Spind (pantry wire; 1" mesh).

April 16. Caught three more today! All seven were weighed and given to R. T. Orr (who is working on rabbits).

For measurements and weights see my old original (cloth bound) journal.

April 17. Caught three more today. The fourth trap (mentioned previously) has continued to catch nothing. Two of these three Jim Ralph took away and liberated in the deer paddock (8 ft (?) fence of 1" pantry mesh enclosing about 3 acres); the third I am taking to the M. V. Z.

April 18. No rabbits caught so far today (4:25 P. M.). By the way - this total of eleven rabbits caught in an area where I had never during my "censuses" seen more than four at a time, indicates the fallibility of censuses except for comparative work. Of course this particular "census" didn't pretend to be accurate, being a record, merely, of rabbits seen on or near the roadway as I passed by each time.

Sylvilagus bachmani
bachmani

April 24, 1932. Alp. Cr. Ranch. Just as woodrats are more easily caught in box traps after one of them has been kept in the trap for a while and allowed to impregnate it with its odor (see under *Neotoma fuscipes amurensis*), so it is also with brush rabbits here. I have on several occasions caught rabbits in my quail traps and ~~later~~ transferred them to some of the box traps which I have set out for rabbits, keeping the rabbits in these traps for 24 hours and sometimes longer. Some of the traps which had never caught a single rabbit during the month or more that they had been set, after being so treated, caught a rabbit a few days afterward. This has happened ^{with} ~~on~~ two different traps, now, a third trap (by the s.w. gate) is an old repeater, having caught several rabbits.

May 13, 1932. The young rabbits are beginning to come out of the brush, and get

Sylvilagus bachmani
bachmani.

9.

caught in the grain baited traps
now - worse luck! I caught
one half grown one today - as well
as another which seemed to be
nearly but not quite full
grown.

May 15. Another $\frac{1}{2}$ grown (or $\frac{1}{3}$ grown, better)
one and an adult.

July 4, 1932 - See census records for remarks
since May 15. Most of the young of
the year are nearly as large as
the adults and may be distinguished
in the field only with difficulty.
Because of the great increase in
the rabbit population due to the
appearance of the young, my
not inconsiderable trapping
activities (see censuses) have
produced no appreciable effect
on the total number, it appears.

April 11, 1933. Alp. Creek R. The first ^{young} rabbits
of the season are commencing to be
born. I know they are the first because
all rabbits brought to the M.V.B.
by me up until now have been
examined by Tom Orr and found
to have only very small embryos

Sylvilagus bachmani
Bachmann

10

during recent weeks, and none at all prior to that. A ♀ gave birth to a litter while in one of the box traps last night.

April 13, 1933. Saw a small rabbit about 1/5 grown - repeatedly today near a certain path. Every time I went past he would dart out from a matted tangle of brush at my feet, and scamper into a nearby thicket. He must have his hide-out in the ~~the~~ tangle. Woodrats are also just commencing to appear (see p. 8, Notes).

Later - One tells me that various authorities claim that new-born young of *Sylvilagus* have no hair, this being a distinguishing characteristic between them and *Lepus*. Yet I feel sure that there was a fine, thin, silky hair on the young mentioned at the top of the page; I think I can remember the "feel" of it, in fact.

May 16, 1933 - See under *Felis domestica*, p. 2, for note on feral house cat eating a rabbit.

May 24, 1933 - See under *Crotalus*, p. 1, for note on a rattlesnake eating rabbit.

Sylvilagus bachmani
bachmani.

11

July 3, 1933. Alp. Ranch. See under
Crotalus, p. 2 for another note of
rattle snake eating a rabbit.

Taxidea

7/22/30.

Los Banos Game Refuge, Merced Co. Calif.
Point 200 yds north of road on S. side of Refuge
and 75 yds ^{west} from Mad Slough. Bleached
skeleton with some hair and hide adhering.

7/31/30.

Dried skeleton with hair + hide adhering
at n.e. side Button Willow Pond, L.B.G.R.

These two animals were in all
probability killed by eating poisoned ground-
squirrels - see notes under *Citellus*.

9/11/30

10 mi. S. of Los Banos on road to Sweeney Ranch.
One seen at entrance to burrow; disappeared
inside when we stopped; stuck its head out for
an instant as we approached, then disappeared
for good.

6/6/31

Peleble Beach property 200 yds e. of s.e.
cor. L.B.D.R. by big ditch. 7:15 A.M. Sunlight.
One seen for a few minutes as it trotted
from vicinity of the big ditch along
the fence line towards a slough nearby,
where rising ground hid it from view.
Part of the time it held its tail straight
up as it walked.



March 11, 1933 - ~~Alvin (Perry)~~ 4 mi. S. of Perris, Calif. One
taken by Chas. G. Hayes, trapper on State Quail
Refuge, had rabbit fur in stomach (stomach
in M.V.3).

Lepidea texus

Sept. 4, 1934, Summer Ranch (N.E. 1/4 Sect. 17, Twp. 75, R3W, San Mateo Co., alt. 2000 ft. Found carcass of a full grown Badger, dead several days, ^{among} rocks infested with ground squirrels. There was blood about his head, yet I had heard no shots in that vicinity. The death occurred before the squirrel poisoning campaign of this area.

Thomomys talpae

3/28/31

Las Banos Duck Refuge, Las Banos,
Merced Co. Calif. ^{fresh} Gopher diggings are
to be seen in great quantities at
many places, as along Mud Slough,
etc. Mrs. McCahe watched a
gopher foraging from his burrow
about 3/23/31. He went out as far
as his tip of his tail from his
burrow, grabbed blades of grass, clover
etc., and backed into his burrow
again in characteristic gopher fashion.
When she examined this burrow
later she found the gopher had
plugged up the entrance from within.
There were a number of burrows
close around that point.

5/14/31

Kauffman Ranch just north of
L. B. D. Refuge. Gopher mounds
are so numerous over there
that in some places areas of
a quarter of an acre present
to the eye an entirely ploughed
up surface formed of mounds which
in the majority of cases actually
over lap. This is a region where
there are lots of good sized willows
growing close together and maples in
abundance.

Vulpes ~~vulpes~~ muticus

10/4/30

Point at base of Mt. Hamilton Range
about 10 mi S. of Los Banos, probably just
across line into Fresno Co. Pile of skeletons
originally described by D.D. McLean as 3 ft high x
6 ft diam when fresh, in 1928. ^① Someone had
lit a fire on one side of pile and burnt about 1/3
of it, ^② many individual skeletons were scattered
about near by, and ^③ the pile had much shrunk
with drying and pressure — never the less, it was
about 2 ft high x 4 ft across even yet [Photos
taken] Mostly kit foxes.

Specimens brought to M.V.Z.:

kit fox	18 skulls
	14 skeletons + skulls
coyote	3 skulls
badger	1 skull
	1 skeleton + skull
wildcat	1 skull

Specimens counted but too poorly preserved to bring home

kit fox	58
---------	----

coyote	5
--------	---

estimate of 35-40 more which } 40
were over-baked, or destroyed

by fire

Approximate total:	kit fox	90
each species	coyote	8
	badger	2
	wildcat	1

(approx) Total number animals

101

Bats

15/30

Railroad
Wong Yellow ~~station~~ Bldg. on
left side of road coming in
to Mendota, Fresno Co. There is
a large white sign on side of
the bldg. and Cheney says bats
very abundant behind it.

Cranes out in open flats
just the other side (south) of
Mendota. Cheney has photographed
them here.

3/16/31 Los Banos Duck Refuge, Los Banos,
Merced Co. Calif. Bat heard "chirping"
overhead about 7:30 (dark for 1/2 hr).
(Heard also once before this but I
forget when).

3/20/31 L.B.D. Refuge. Near Button willow ponds,
about 9:30 P.M. - Three bats observed
at one time in the pond headlights
hawking for insects. That is a large
number of bats for such a small
radius and indicates that they are
abundant.

Crotalus

May 24, 1932. Alpine Creek Ranch, (Ralph Estate), San Mateo Co., Calif.
Buster McMillan says that this place is heavily infested with rattlesnakes - says one year they killed a rattlesnake every morning for 14 mornings. ^{Some} People call this the rattlesnake ranch. They have killed at least two this year, maybe more. I was out my first today when hunting for quail nests; I looked at a bush and heard a faint buzz. Immediately afterward I made out a wavy line of grass marking the path of the retreating snake. He got away into the brush before I could collect him.

July 20 - Ethel killed a large one near the barn. Three have been killed during the last week.

May 23, 1933 - One killed by Ralph's porch; stomach empty.


May 24 - One killed by deer paddock, 150 yds from Q.D. Stomach contained one small brush rabbit.

June 14, 1933. Another, killed same place as

the above, also had a small brush rabbit in its stomach.

July 5, 1933 - Alp Ranch. Fullerton, the forester man, says that two days ago he killed a very large rattles (15 rattles + a button) which had the posterior (!) half of a full grown brush rabbit inside of it. A small rattles killed a few days ago had the remains of a fence lizard (Sceloporus) in it, he said.

April 2, 1936. Summer Ranch, Santa Cruz Mountains San Mateo Co., Calif.

Today killed an 11 inch baby rattles of the normal diameter of a very large fountain pen, and just a button. So enormously swollen was he ^{however} with something that he had eaten that his shape was like this 

Dissection showed the stomach distended with a full grown lizard, Sceloporus, of 5" in length and at least 50 % ~~the~~ more than the normal diameter of the snake at its thickest point. The battle to subdue this lizard must have been strenuous.

May 17, 1936 Summer Ranch (see preceding page). Two more snakes gave the following data:

Length of Snake

30"

12"

Stomach Contents


1 baby ~~with~~ ^{without} brownish rabbit about 4" long (hair well developed).

1 adult Peromyscus
m. gambelii



King snake

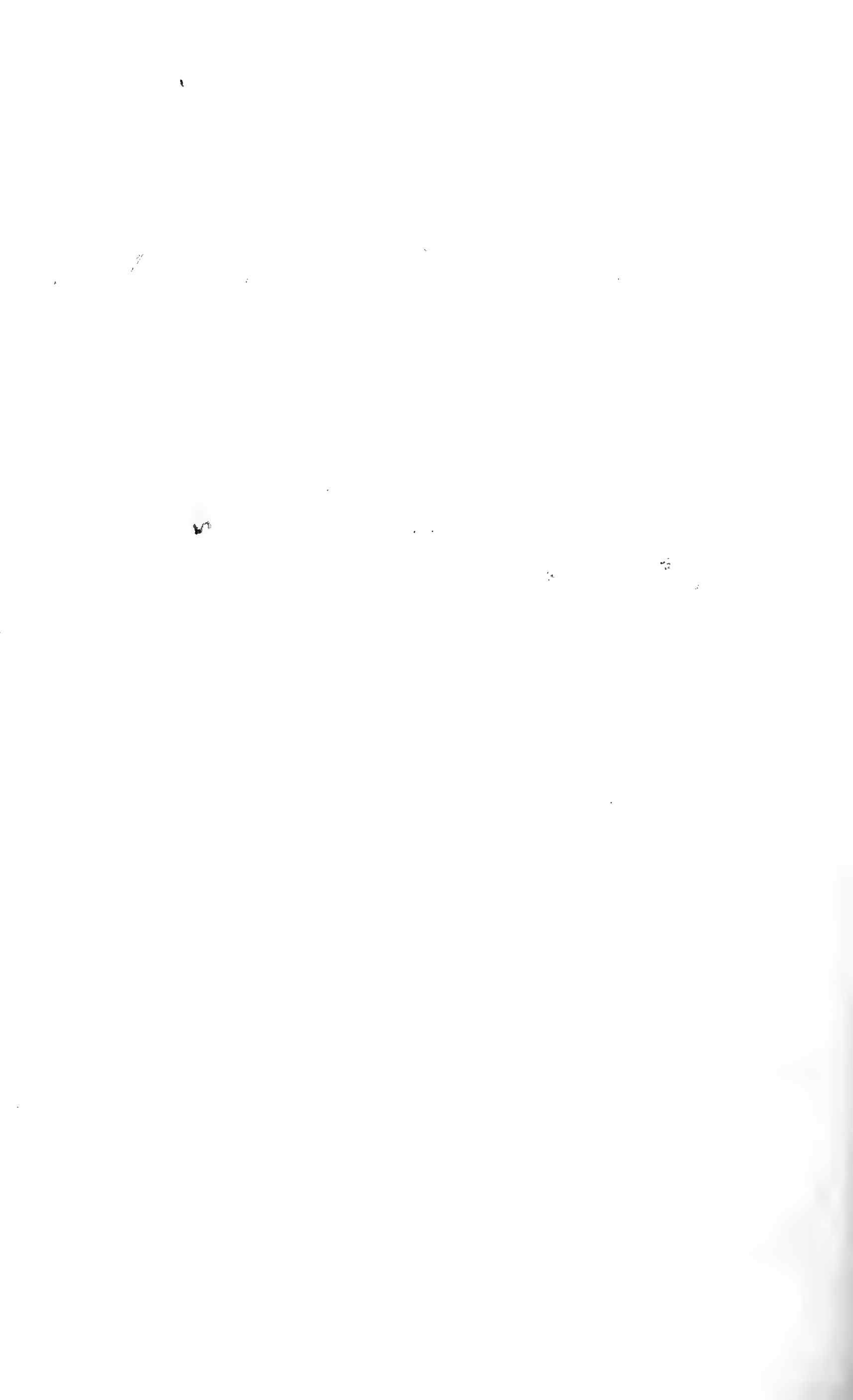
Lampropeltis
getulus Croyli

June 25, 1933. Alpine Ranch, 8 mi S.W. of Pantola,
San Mateo Co., Calif., elev. 1700 ft. One of
these had two $\frac{1}{3}$ grown *Microtus* and
the tail of a lizard (*Gerrhonotus*) in its
stomach. One of the mice had
evidently been swallowed posterior end
first, as its head was pointing toward
the snake's mouth . The
lizard had been swallowed head first.

5/21/31 N. side of Salt Slough 7 mi N.E. of
Las Banas, Merced Co. Calif., and about
2 mi n. of the Las Banas Duck Refuge.
One seen lying in the road; I straddled him
with the car without his attempting to
escape, and then, stopping the car,
returned and collected him. At first I
beat him with an empty grain
sack, using it as a flail. It did him
no actual injury ~~however~~, apparently,
and yet was sufficiently violent to cause
him - after a preliminary stretching out
to glide away - to call up and
lie perfectly still, as though playing
"possum". At length, seeing that I
was not harming him I rolled one
end of the sack and resumed the
beating. At the first blow he
uncoiled and made haste to
escape but the second stroke
knocked his back and he lay
still. Specimen saved.

Gopher Snake

- 7/10/30 Los Banos Game Refuge, Calif. See under "Sylvilagus" for account of feeding. Note - perhaps this is part of reason why squirrels are so very uncommon in this section.
- 7/31/30. Very large individual stretched out on knoll at n.e. cor. Button Willow Pond as sun was setting.
- 9/20/30 Small one seen early in morning (8:45) stretched beside road on w. side Refuge N. of Holt's met.; sluggish.
- 3/15/31 I saw a ♀ horned lark moving about (evidently not "hypnotized") and when I went over to see if she had a nest found a 1/4 grown (20") gopher snake in the short grass and weeds about 2 ft away. Perhaps he got the Kildus egg which disappeared nearby (see *Oxyechus* 3/15/31 p. 25 and preceding).
- 3/16/31 One enormous individual taken from bank just across line from Refuge, on w. side mud Slough. Put into box with molibut about 12:30 P.M. but nothing ever happened so removed.
- 3/22/31 ~~Two~~ A small gopher snake taken today and put with the large one mentioned above, into a box. Later this same



Pituophis catenifer

Gopher snake 2.

day two more adult snakes
were taken, ^{one} north of Olson pond
and the other by the 3 l. tower, and
they too were put into the same box.

4/4/31 L.B.D.R. Two seen today - one small
one $1\frac{1}{3}$ ft long by the 3 l. tower - killed
I think by someone - and one large adult
by the main bridge over M. Slough, not
collected.

4/11/31 L.B.D.R. w. of 3 l. tower. One seen in
middle of road - large size. Thompson
repeatedly into a nearby pond but
swam out each time - I finally let it go.
All the snakes originally put in the
box still in good health. Let one of
the largest go about 4/2/31. McEllan
says one of these snakes got into the
chick pen and swallowed two mallard
eggs before being killed. The eggshells
were broken but the yolks inside
were about to hatch so that it made
two large lumps. McE. kills these
snakes whenever he finds them.

4/20/31 L.B.D.R. just no. of Hobbs. Ranover
a large one - was going too fast to stop.

4/21/31 Refuge Bulbo nesting tree - one full
grown one crawling over base of tree;
left undisturbed.

Pituophis catenifer

3.

5/9/31 L.B.D.R. by Salmon Slough over-
flow. As I was wading and pushing
through the long, dense rush grass
by the side of a slough, I heard a series of
faint squeaks directly under my
feet. Thinking I had stepped upon a
meadow mouse I pushed the grass
aside only to find a medium-large
gopher snake, coiled about a meadow-
mouse, and quite hidden beneath
the ^{very} dense and hanging grass tops.
I stopped perfectly still instantly, let
the grass fall back and waited,
peering intently. The squeaks had
ceased by this time. For about
five minutes I waited, then I saw
the snake slowly, cautiously,
deliberately uncoil and push his
head through the grass this way
and that seeking the head end of the
rodent. He moved by little stealthy
jerks in characteristic reptile
fashion when moving stealthily -
insect like too. Finally he got hold
of the head end and commenced
swallowing. The swallowing was
rather rapid and was continuous, the

Pituophis catenifer

4.

photos.

meadow mouse steadily disappearing down the snake's much distended throat. Most of the "strikes" of the snakes head is dorsal-ventral rather than laterally, instead of lateral (see photo). When the big meadow mouse was $3/4$ down, I pounced on the snake, severed the vertebrae to keep him from disgorging, and took the photos. meadow mouse saved!

5/23/31 L.B.D. R. Mud Slough by the ford.

A very large one (4 ft?) found where the men had killed it.

6/5/31 One very large one (also vicious, advancing upon me and lashing out) on Salmon Slough over flow on open grassy flat.

6/7/31 One in tule patch - rather small one. These dense tule patches, which become so matted together by the mud which gradually interbeds their lignified growths, that a man can not push his way, but must wade through - these patches must be a fine place for snakes for they can move about (as this one did) high above water, and there are plenty of song sparrow nests etc to feed on; also tules make a nice safe retreat.

May 12, 1932 Alpine Creek Ranch (Rolph Estate),
San Mateo Co. Calif. at the quail
incubator (= Q.D.). As I was walking
past the nest, some my attention
was attracted by faint squeakings
in the tall grass 6 feet away. It took
some careful parting of the grass,
guided by the squeaks, and as it
continued, to locate the source -
a ball of plied grasses at the base
of a clod. Some of the grasses were
chewed up into short ($3/4$ " sections).
As I put my hands into it a
gopher snake put down his head
from beneath it. He had just
disgorged a baby ^{meadow mouse} mouse, which
to judge from the saliva with
which its anterior end was
partly coated, had been half
swallowed. at the time of my
interruption; it was still alive.
There were nine more of these
nests in the nest, and I felt none
in the body of the snake, so the
total must have been ten. Their
weights were as follows: 3.8,
4.1, 3.7, 3.35, 3.8, 3.3, 3.05, 3.9, 3.9, 3.75.

Pituophis catenifer

6.

The snake I killed because it constituted a menace to the Q. D. quail. I am beginning to believe that during the nesting season snakes constitute a greater menace to quail and other birds than all other predators combined; they are so ubiquitous, so numerous, and they penetrate into all places. I have not, during the nesting season, will never, capture, destroy, or even locate them, or their eggs; its fall will be lived upon mooring, conspicuous snakes who have already fulfilled their biological purpose by that time anyway. The same applies to other predatory birds and to predatory mammals. Snakes, on the other hand, are everywhere, especially in the tall grass, unweary, where the quail are nesting. Think how many snakes I have seen this spring around the Q. D., then take the skunk, our commonest fur-

Pituophis catenifer.

7

beaver, and imagine what an astonishing thing it would be if I had seen as many of them as I have seen snakes. And yet I haven't seen a single skunk, although they are at least as easy, taking daylight and darkness into account, to see as snakes - and on the other hand I doubt if I have seen a tenth of all the snakes that have been around the Q. I. this spring. Think, too, of the abundance of snakes as compared with the scarcity of predation.

In spite of the widely diverse environmental and animal conditions, the Los Banos Duck Refuge and the Alpine Duck Ranch are alike with regard to this question of the relative damage wrought by snakes and by predatory animals and birds.

May 23. Killed one of these on the Los Banos Road (inside Ralph Estate). Its stomach contained one partly digested full-grown peachey gopher.

23

Pituophis catenifer

8

and, further down, a mass of
either mouse or gopher hair
belonging to another individual.

Aug 23 -

^{at B.R.} Saw a $\frac{1}{2}$ grown one at the edge of the
Q.D. just as it saw me and backed
down out of sight into ~~the~~ a gopher
passageway that parallels the Q.D. at
that point.

Chamnophis ordinoides
~~abundant~~

April 11, 1932. Alpine Creek Ranch (Ralph Estate),
San Mateo Co., Calif. By experimental
quail inclosure. An immature specimen
about 9" long captured as it was hovering
across the road, and given to the
M.V.Z. This is the first snake that
I have seen this year up here.

April 15, 1932. Same locality. Another, considerably
larger (18" about) taken at about
the same spot. Given to the M.V.Z.

April 24. Alp. Cr. Ranch. Quail inclosure (= Q.D.).
Ethel saw a small one today (about
12" long).

April 27. Captured one about 16-18" long; took
it to L.J. Inglis.

May 8, 1932. Saw two of these by the w. side of
the Q.D., moving stealthily about.
(see under *Toxastoma*, p. 8 for detailed
description). Both left before I
could make a capture.

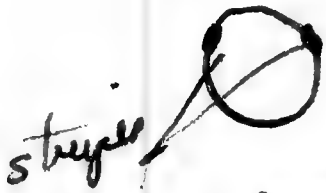
See pp 6-7. *Pituophis catenifer* has
comparative destruction wrought
by snakes and by predatory birds
and mammals.

May 13. Got another one of these by the
Q.D. This one was differently
marked from the rest in that

Phamrophis andrivaides

2.

it had two stripes instead of three,
and in different places; also
the stripes were more distinct:



cross section
May 13 individual



cross section
Previous individuals

June 7, 1932. Orchard back of McAllans. While beating
brush for quail I caught a glimpse of
a snakes tail disappearing into the
thick brush. The snake could hardly
have been longer than 18". I am
not at all sure that it was of this
species, either (in fact I think it was
of the *Pituophis*-like kind that I
caught one of only to have him escape
from his jar before identification -
a very small snake he was).

June 21, 1932. Alp Cr. R. by Q.D. "garage". One large
individual caught. Its stomach contained
one lizard (*Sceloporus*). I had not
time to examine the whole alimentary
tract, merely cutting it open at the
one lump which I could feel, and
discovering the lizard.

July 22, 1932. Alp. Cr. R. near big water tanks. Saw
two snakes, presumably of this species,
just for an instant. They wriggled!

Phamophis andinaeides 3.

off before I got a good glimpse of them.
Aug 22, 1932. Alp. Cr. R. Saw one for an
instant by ~~the~~ bathhouse, another
by the edge of the C.D. The latter tried
to climb the 20" screening which
covers the lower part of the C.D., but
it was unsuccessful. This snake
got away later, when I put it into
the sparrow hawk's cage.

July 29, 1933 - Alp. Cr. R. Have seen many of
this species all summer, mostly small
individuals. Killed one today which had
a $\frac{1}{2}$ -grown gopher inside it. What I
cannot understand is that the gopher
smelled very rotten, ~~its~~ flesh was
exceedingly soft and decayed, and it was
covered with many small (recently
hatched; 2 mm. long) maggots. The
maggots were all dead, due I suppose
to the action of the snake's digestive
fluids. They must have been present
on the gopher before swallowing,
which indicates that the snake
swallowed carrion - unbelievable
though it may seem.

Phamophilus ordinoides
cauchii

4/21/31

Los Banos Duck Refuge, Los Banos,
Merced Co. Calif. By Salmon Slough.
One seen lying in middle of the road, and
picked up before it could amble off-
sawed - a considerable part of its tail is
gone. (Later - discarded).

Census - Bush night - Chipmunk
Alpine M. Finch

9/27/31 { Bush night - 2
 { Chipmunk - 0

9/30/31 Bush night - 2

10/1/31 B. male - 2

10/24/31 Chipmunk - 1

10/27/31 B. male - 2

10/31/31 B. male - 1

11/1/31 B. male - 1

11/21/31 " " 1

4/31 Purley system (↑) because I haven't recorded the times when I have been here; so far they have been infrequent (the times I mean); from now on this census will record the duration of time for every occasion that I am here, regardless of whether I see maluts or not.

12/13/31 arrived at 10 A.M. 1 (malut).

12/14/31 all day until about 6:30 0

12/16/31 got in late last night, here all day today. 1

12/17/31 Left about noon 1

Dec 19, 1931 arrived about 3:30 P.M. It was raining steadily; it had started at about 11:30, they said.

Dec 20, 1931 Rained hard during early evening last night and stayed until about 3:30 P.M. 1

Dec 31, 1931 arrived about 4 P.M. 1

Jan 1, 1932 left at about 3 P.M. 0

Jan 4, '32 arrived about 4:30 P.M. 0

Jan 5, 1932 Here all day 2

Census - *Bunchgrass* - *Chrysothamnus*
alp. Creek Ranch.

Date	Remarks or length of time spent	animals seen
Jan 5, 1932	All day until about 4:30 P.M.	2, 2
Jan 6, 1932	Around 10:30 A.M.; here all day	1
" 7, 1932	All day until about 4:30 P.M.	1, 5
Jan 11, 1932	Present for an hour and a half in P.M.	0
Jan 13, 1932	" " " " " " " " " " " " Saw tracks of about 3 rabbits on road to gravel inclosure.	
Jan 15, 1932	Present from 11:30 A.M. to 5 P.M.	0
Jan 18, 1932	" " " " " " " "	0
Jan 23, 1932	" " 1:30 P.M. to end of day	0
Jan 24, 1932	Present all day	1
Jan 25, 1932	Present until noon.	0
Jan 27	Present 11 A.M. - 6 P.M. but worked under the Ford nearly all day, so hadn't much chance to see anything.	0
Jan 29	12 - 5 P.M.	0
Feb 3, 1932	\$12:30 - 5:30 but was under Ford all day.	0
Feb 5	2-5 (but mostly down at Menlo Park on an errand)	1
Feb 10	1:30 - 4	0
Feb 12	11 - 5:30	0
Feb 15	1 - 5:15	0
Feb 17	1 - 5:15	0
Feb 22	11:30 - 5:15	0
Feb 24	11:00 - 5:30	0
Feb. 26	2:30 - 5:45	2

Census - Brush rabbits, 3.
chipmunks. also Creek Rats.

Date	Remarks on length of time spent	Rabbits seen.
Feb 27, 1932.	11 A.M. - 5:50	1
Feb 28, 1932	11 A.M. - 5:30	1
Feb 29, 1932	11 A.M. - 6:10 P.M.	0
Mar. 2, 1932	11:30 A.M. - 5:15 P.M.	0
Mar. 4, 1932	11 A.M. - 5:15 P.M.	2
Mar 6	11 A.M. - rest of day	2
Mar 7	All day until 6 P.M.	2
Mar 11	11:10 - rest of day	0
Mar 12	All day until 5:25 P.M.	1
Mar 13	3:10 - rest of day	0
Mar 14	All day until 5:45 P.M.	0
Mar 19	12:15 P.M. - rest of day	2
Mar 20	All day	1
Mar 21	All day until 5:30 P.M.	2 + 1 chipmunk
Mar 23	10:30 A.M. - 5:15 P.M.	2 chipmunk
Mar 25	11:15 A.M. - 7 P.M. (dark)	0
Mar 26	10:30 - rest of day	4
Mar 27	All day	4
Mar 28	All day until 7 P.M.	1 (trapped).
Mar 30	10:30 A.M. - rest of day	4
Mar 31	All day until 5:15 P.M.	1
April 1	about 11 A.M. - rest of day	2
April 2	All day until 5 P.M.	0
April 4	11:15 A.M. - 6 P.M.	1
April 6	11:30 A.M. - 5:30 P.M.	3.
April 8	11:20 A.M. - rest of the day.	0

Census - Brush rabbits, ^{4.}
chipmunks. Alp. G. Raccoon

Date

Remarks on length of time spent Rabbit

April 9	All day until about 6:17 ^{P.M.}	3
April 11	1:45 P.M. - 7 P.M.	1
April 13	11 A.M. - 5 P.M.	3
April 15	11:40 - rest of day four of these were caught in traps (see under <i>Sylvilagus</i>); the other four were seen in the brush.	8
April 16	All day until 8:15 P.M. # 5(?) three of these were caught in traps. I think I saw about two more, but am not sure	
April 17	11:30 A.M. - 9 P.M. All three of these were caught in traps	3
April 18	11:30 A.M. - 5:15 P.M.	0
April 20	11: A.M. - 6 P.M.	0

Note - of course this census must be considered in relation to all the rabbits that I have been trapping

April 22	6: P.M. - rest of day	0
April 23	(the 2 caught in box traps) all day	2
April 24	All day until 7:15 P.M.	0
April 26	11:15 ^{A.M.} - rest of day (caught in <u>live trap</u>)	1

Census - Brush Rabbits 6.

Chipmunks - Cottontails

Alp. Cr. Ranch Cottont. Brnab.

May 26

all day until 10:15 A.M. 1 2

the cottontail was in one of the rabbit traps.

May 27

6 P.M. - rest of day 0

May 28

all day 1

May 29

" " until 6:45 P.M. 1

~~cottontail~~, in trap

May 31

5 P.M. - rest of day ab. 2

June 1

all day 2 + 1 in trap

June 2

all day ab. 2

June 3

all day until 6:45 P.M. about 1

June 6

1:30 - rest of day 3

June 7

- all day + about 6 chipmunks; 2

all in one place they were (by goat yard) and must have been a whole dam family.

June 8

all day ab. 4

June 9

all day until 4:30 P.M. - about 1

June 12

12 P.M. - rest of day - 4

at least one of these was a cottontail.

June 13

all day until 6:15 P.M. ab. 5,
one at least, probably more, was
a cottontail. One was caught in
a box trap.

June 18 -

crowded at 8:15 P.M. —

June 19 -

all day - ?

June 20

all day *

ab. 5

7.

Cervus - Brush Rabbits.
Chipmunk - 20 tonsails.

June 21	all day until 10 A.M.	0
July 3	6 P.M. - rest of day	7-8. Some.
	of these may have been co. outails	
July 4	All day	ab. 2
July 5	All day	ab. 3
July 6	All day	—
July 7	"	1 chipmunk 2
July 8	"	about 3
July 9	"	ab. 4
July 10	"	ab. 4
July 18	6: P.M. - rest of day	
" 19	All day	ab. 2 (1/3 brown baby in trap)
" 20	all day	ab. 3
" 21	" "	ab. 4
" 22	" "	" 3
" 23	" "	" 3
" 24	" "	" 4
" 25	" .. until ab. 5 P.M.	ab. 2.
Aug 17	8 P.M. - rest of day	0
Aug 18	all day until 5:15 P.M.	0
Aug 22	3 P.M. - rest of day	about 3
Aug 23	- All day until 4 P.M.	
Aug 24	- 7 P.M. - rest of day	0
Aug 25	- All day until 7:30 P.M.	ab. 3
Aug 29	- 5:10 P.M. - rest of day	ab. 3
Aug 30	all day until 5 P.M.	6
Aug 31	5 P.M. - rest of day	3
Sept 1	All day until ab. 5	ab. 3

Census - Brush Rabbit 8.
Chymimus - Cottontails

Sept 3 - 5:15 P.M. to rest of day 2 in traps
+ ab. 3. (20?)
cotton tails

I have not been distinguishing well enough between cottontails and brush rabbits. The two caught in the traps, at least, have cotton tails, if that indicates anything (must look this up), also they have all the looks of cottontails.

Sept 4. all day until 5:15 P.M. 1 in trap + ab. 3 more. also, 1 chymimus

Sept 5 4 P.M. -- rest of day ab. 2

Sept 6 all day until 4 P.M. 1 in trap + ab. 2

Sept 12 - 5 P.M. - rest of day. 4 + 1 in trap

Sept 13. all day until 5:45 ab. 7

Sept 16. 2:30 P.M. - 7 P.M. ab. 14

(most of these seen near the Governor's house).

Sept 17. 3:30 P.M. - rest of day ab 3.

Sept 18 All day until

Sept 19 ab. 3 P.M. - rest of day ab. 1

Sept 20 all day until 5 P.M. ab 2 plus one in trap.

Sept 23 2:30 P.M. - 6 P.M. ab. 1 plus one in trap

Sept 24 2:30 P.M. - rest of day ab. 1 plus one in trap

Sept 25 all day until 4:30 P.M. ab. 3

Census - Brush rabbits. 9.

Chipmunks.

Rabbits

Sept 30 -
Oct 1

3 - 6:30 P.M. ab. 3
4 P.M. - nest of day ab. 4
also one chipmunk, at
top of hill above quarry.

Oct 2

all day until 5 P.M. ab. 6
also one chipmunk
caught in trap by
boat house.

Oct 5

5:30 P.M. - nest of day ab. 2

Oct 6

All day until 5:15 P.M. ab. 3

Oct 8

Only after 10:30 P.M. -

Oct 9

All day until ab. 4:30 ab. 2

Oct 11

4:30 P.M. - nest of day 0

Oct 13

All day until ab. 4 P.M. in trap
+ 4 others
Heard one chipmunk

Oct 19

4 P.M. - nest of day 4

Oct 20

- ~~Cool, windy, also~~ all day until 4 P.M. ab. 4

Oct 22

- 12:30 P.M. - 6:30 P.M. ab. 2

Oct 27

- 11:30 A.M. - 6:15 P.M. ab. 1

Oct 29

3:30 P.M. - nest of day 4

Oct 30

all day until 4 P.M. 3

Nov 4

7:30 P.M. - nest of day 1

Nov 5

all day ab. 3

Nov 6

all day until 3 P.M. ab. 1

Nov 23

2:15 P.M. - 6:15 0

Nov 24

12 M - nest of day ab. 2

Nov 25

all day ab. 2 + 1
chipmunk.

Census - Brush Rabbits Chaparrals

10.

Nov. 26	all day	obs. 3
Nov 27	all day until 5 P.M.	obs. 2
Nov. 28.	2:30 P.M. - rest of day	0
Nov 29	All day until 3:30 P.M.	1 - shot by mistake. Also 1 chaparral.
Nov 30	4:30 P.M. - rest of day	obs. 1
Dec 1	All day until 4:15 P.M.	obs. 1
Dec 3	9:30 P.M. - rest of night	0
Dec 4	All day until 5:15	3
Dec 14	9:30 P.M. - rest of night	0
Dec 15	all day	obs. 6-7
Dec 16	all day until 1 P.M.	obs. 5-6
Dec 20	3:30 P.M. - 6:30 P.M.	0
Dec 22	3:30 P.M. - 8 P.M.	0
Dec 23	4: P.M. - 6:30 P.M.	0
Dec 24	4:30 P.M. - rest of day	
Dec 25	All day	obs. 3
Dec 26	all day	obs. 2
Dec 27	all day until 11:30	obs. 2
Dec 28	4 P.M. - rest of day	obs. 2
Dec 29	All day until 1:30 P.M.	obs. 2
Dec 30	7:30 P.M. - rest of day	obs. 0
Dec 31	All day	obs. 4
Jan 1, 1933	All day	obs. 4
Jan 2	All day until 11:45 P.M.	obs. 2
Jan 4	3:30 P.M. - rest of day.	1
Jan 5	All day	obs. 6
Jan 6	6 P.M. - rest of day	0

Census - Brush Rabbits etc.

11

- Jan 7 All day ab. 4
- Jan 8 all day until 5:30 P.M. ab. 5, of which two were shot; given to Cowan, of M.V.G.
- Jan 11 5:15 P.M. - rest of day 0
- Jan 12 all day until 10 P.M. 2 - both caught in traps. given to Pa. Pl. Res.
- Jan 13 9 P.M. - rest of night 2
- Jan 14 All day 1 caught in traps. given to M.V.G. coll.
- Jan 15 all day until 10 A.M. ab. 1
- Jan 17 10 P.M. - 7 P.M. ab. 4, two of which were in box traps, given to Pa. Pl. Res.
- Jan 20 - 12 M - ab 7:30 P.M. ab ~~2~~ 2
- Jan 21 - 12:30 - 7 P.M. ab. 3, of which two were caught in box traps; one escaped, others given to M.V.G.
- Jan 24 - 12:30^{P.M.} - ab. 4:30 P.M. 1 in trap (given to M.V.G.).
- Jan 25 4:30 - 5 P.M. 0
- Jan 29 1^{P.M.} - 7:30 P.M. 1
- Jan 30 5 P.M. - 7:30 P.M. 0
- Feb. 2 12 M. - 4:30 P.M. 0

Census - Bush Rabbits etc.
Calendar of Days spent at
Alp. Cr. R.

12.

Feb. 3. ab. 11 A.M. - rest of day } about
Feb. 4 all day until noon. } 20, of
Feb. 5. Noon until 4:30 } which
Feb. 6 8:30 until 6:30 } 8 were
captured in traps.

Saw ab. 3 *Lepus*

Ever since I have started this rabbit census, last year, the rabbits have continued to be abundant, in spite of my family extensive trapping activities. Like the jays, they have been able to fill in their ranks as fast as they are depleted. From now on I shall not record individuals seen or captured, here, unless the population numbers change noticeably.

This section will be from this time forth devoted to recording my visits to the Alp. Cr. R. the duration of stay, hours of arrival and of departure.

Feb. 8 4 P.M. - 7 P.M.

Feb. 9 11 A.M. - 9 P.M.

Feb. 14 11 A.M. - 6 P.M.

Feb. 16 12:45 P.M. - 5:15 P.M.

Feb. 17 night only

Feb. 18 most of day

Feb. 19

From now on this section will be concerned with the weather.

Weather record - Alpine Creek Ranch.

9/2/31 Misty last night but warm; foggy in early morning

9/10/31 Clear but cool and windy yesterday afternoon, with a real autumn nip; foggy last night and then, towards morning, ^{clear and} cold. Clear, cold, and rather windy at 8 A.M.

9/22/31 Yesterday afternoon; warm, clear, windless (warmer than 9/10/31. Night, comparatively warm, with a breeze towards morning.

This A.M. clear, fairly warm, rather windy.

McLellan says it rained quite briskly two or three days ago - the first rain of the season.

9/27/31 Arrived this afternoon. Rather warm, sunny, and not windy - a bit of a chill towards evening (chill at 5:45 these days) - just enough to warn of the approach of winter.

9/28/31 Morning clear, sunny, somewhat windy, also very decidedly chilly. Last night was

Weather Record Alpine Creek Ranch. 2.

cold, too.

9/30/31 Warm, clear, and windless this afternoon and evening, warmer than it has been for weeks.

10/1/31 Dawn comes now at 5:10 A.M., about. Day is clear, warm, and windless.

10/24/31 Clear and warm. Has rained pretty steadily during the last two days, however, and they say it has been very cold and wet.

10/25/31 Clear and rather warm until about 9:30, when it clouded up quickly and soon began to rain and blow, although not very cold. I left, but judging from down below, it must have cleared again towards evening.

10/27/31 Clear and warm

10/31/31 " " "

11/1/31 " " "

11/2/31 " " "

11/8/31 " " "

11/8-19/31 } all through this period no rains.
About two rain storms, with cold foggy weather and wind.

11/21/31 Cleared up about 3 days ago. Today very windy and cold; quite uncomfortable just the minute the sun went down.

Weather Record - Alpine
Creek Ranch.

3.

12/14/31 I haven't been here much - just for
an hour or two at a time. I should
have recorded the weather at such times
anyway, but didn't. Mostly it has
been cold and cloudy when I have
come, and frequently in my absence,
it has rained for a day or more at a
time. The little pond down by the
boat house has filled up to a depth
of perhaps $2\frac{1}{2}$ feet. Day before yesterday
it snowed, they said, although the snow
did not last long at this altitude.
Yesterday was cold and foggy, although
it did not rain; it cleared off in the
early evening, ^{and} there was a moderate
frost last night. Today it is
clear and sunny, but still (10:30 A.M.)
cold, although not windy.

12/16/31 Moderately warm all day; clear until about
4:30, when it began to cloud up; looks like
rain.

Dec 17/31 It did indeed rain last night, but was
clearing when I left at noon.

Dec 18/31 Began to rain at 11:30 and rained
steadily all the rest of the day.

Dec 20, 1931 Rained hard in early part of the night
last night and slackened up toward the
middle of the night. Today was cold and

Weather Record - Alpine Creek Ranch.

4

for the most part cloudy, although
the sun did come out at intervals
for fifteen minutes or so at a time.

Dec 31, 1931

It has rained almost all day.

since the 27th.

at last a day of

weather.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

to be.

Jan 1, 1932

Cloudy and cold in the A.M. About
11:30 it began to rain so I left.

Jan 4, 1932

It has been clear since Jan 2
(although I haven't been here). Today was
warm and sunny.

Jan 5, 1932.

Clear and moderately warm all day.

Jan 6,

Clear and warm all day.

Jan 7, 1932

Jan 11

Clear until about 3:30^{p.m.} when it
suddenly clouded up and became
cold and very misty (droplets
of large size suspended in the

Weather Record -
Alpine Creek Ranch.

5

air. That night it rained (also the next day, though I wasn't there).

Jan 13, 1932

The rain mentioned above turned out to have been snow, which they said was six inches deep on the level this morning. When I got there it was still about four inches deep, although melting rapidly, the ground being soft and slushy. At 5 P.M., though, with the sun behind the hills for half an hour, ice crystals were forming on all the standing puddles.

Jan 15, 1932.

Yesterday it clouded up again and snowed 6 inches during the night. Today it rained until about 10 A.M., being cloudy and foggy and chilly the remainder of the day.

[Saturday it must have rained - or snowed - still more. I was not there to see hammer. ^{yes, it did, according to Bill Johnson}

Jan 18.

Today was the first sunny day I have seen for a long time. It was actually warm and clear, even though the valley below was full of fog which later turned to a light rain (in the evening).

Jan 22, 1932.

It hasn't snowed since the 16th, and yet scattered patches of snow are

Weather Record - Alpine Bush Ranch.

6.

still present on the top of the ridge. Today has been clear, ^{with} and bright but warm only in the direct rays of the sun. In the shade the frost doesn't melt until mid day, and then at about 4 P.M. it commences to freeze up again.

Jan 23, 1932

Bright and clear but cool as above

Jan 24

" " " " " " " "

Jan 25

Cloudy, cold; getting ready for a rain

Jan 27.

Rained yesterday, all bright. Today was bright and cool again.

Jan 29.

Rained yesterday; today fitfully overcast alternating with ^{cloud} fogs (really clouds); cold and windy throughout the time.

Feb. 3, 1932.

It has rained and snowed - but mostly ~~snow~~ rain from Jan 30 to Feb. 1 (inclusive). Today the snow is largely gone and it is moderately warm - also sunny, although with the clouds threatening another storm in the near future.

Feb 5, 1932

Yesterday it rained hard (Bill told me); today it rained lightly, drizzled extensively, and was cloudy all the time ^{and 8th}.

Feb 10, 1932.

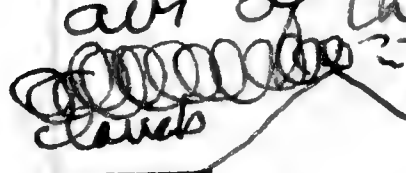
The 6th & 7th it rained very

Weather Record Alpine Creek Ranch 7.

heavily, being one of the severest storms so far. The 9th cleared.

Today was sunny and cool, being one of the few pleasant days which we have had recently and showing a bit of spring, at least in contrast with the harsh gloomy weather which we have had for so long.

Feb 12 Warm, sunny, and spring like - the air was like a caress, until the sun went down, when it immediately grew chilly and dreary once more.

Feb 15, 1932 Cool but sunny, until 1:30 P.M. when it grew cold and windy. For a while the sun remained out, but about 3:30 the clouds covered its face and the climate changed almost at once to cold, damp, dismalness with little spots of light rain. The clouds came in from directly west (the ocean), blown before a fierce wind. At first they would melt away into nothingness as they struck the warm air of the east side of the ridge  - this was

so plain to be seen that one could watch individual clouds sweep

Weather record Agave Creek⁸.
Ranch.

up to the top of the ridge (in reality slightly beyond it) and then rapidly spread away and disintegrate, while new ones were blown in to take their places in the advance guard.

Feb 17 Mild, warm, and windless, as long as the sun was out it was warm that is, but with its setting the air took on a chill breath almost immediately.

Feb 22. It has not rained since the 9th of the month. Today was warm, sunny, and windless. On the road past the quarry I saw ice in the ditch even today, though.

Feb. 24. As above; it sprinkled slightly in the early morning, but cleared before noon.

Feb 26 Warm to the point of being uncomfortable; ^{hardly} not a cloud in the sky. Hareharrowing was done on the 23d + 24th; today the hareharrowing was completed.

Feb 27 Weather as above, sun-flower seeds sown.
Feb 28 Foggy and cool in A.M.; Windy in the early after. noon, and then, in the late after noon, with the dispersal of the clouds and the breaking through of the sun, warm and mild again.

Weather Record - Alpine 9. Creek Ranch

- Feb. 29 About as yesterday.
~~Feb~~ Mar. 2, 1932 " " " ; still the
 rains hold off.
 Mar. 4 Fine, warm, spring like
 Mar. 6 " " "
 Mar. 7 " " "
 [Mar. 8. Not present at alp. Cr. R., but it rained
 and drizzled all day in Berkeley with
 a widespread storm said to be approach-
 ing.
 Mar. 11 Clear today; ^{and moderately warm.} doubtless cloudy yesterday
 with little or no rain, ditto the day
 before with rain the 8th — at least
 that was the situation in Berkeley.
 Mar. 12. Brief hours of sunshine in the
 early morning; cloudy and warm the
 remainder of the day.
 Mar. 13. Cloudy; chilly, and windy toward
 evening. (with rain at about 9 P.M.).
 Mar. 14. Moderately heavy rains all last night
 and all day today up until about 4:30
 P.M.
 Mar. 19. Light rains all day long; weather cool.
 Mar. 20. Clear, but cool today, with a nip
 to the air, especially after sundown.
 Mar. 21. Clear and warm.
 Mar. 23 " " "
 Mar. 25 " " "

Weather Record - Alpine

10.

Creek Ranch

Mar 26, 1932.

Clear and warm

Mar 27

Mar 28.

" " "
Cloudy and foggy last night;
cloudy until 12 noon today,
with a heavy mist, at times,
that was almost a rain.
Sunny and windy and cold
all after noon.

Mar 30, 1932.

Clear and warm

Mar 31

April 1

April 2

" " "
~~For~~ Clear in afternoon; foggy, ending
with a heavy drizzle - almost a
rain - during the middle of the
night.

April 2

Continuation of the weather conditions
of last night; the drizzle became
practically a light rain at times
and then would thin down to the
substance of a heavy fog at other
times. When we descended the
mountain, on our way home, in
the late afternoon, we found
that the lowlands were in
bright sunlight, with only
a few scattered clouds here
and there in the sky. The moun-
tains behind us, which we had
just quit, were wrapped in a dense

Weather Record - Alpine Creek Ranch. 11.

gray-white pall of cloud which cut off their summits from view with a sharpness like that of a shore-line of an ancient inland sea. It was a striking illustration of the difference in climate between mountain and lowland, and explained the statement made by Buster McAllan that hay was cut 1-2 months later at the Alp. Cr. Ranch than that of the valley. This drizzle, by the way, was wet enough to make a superficial slick layer - of extreme thinness - on the adobe soil, but it did not wet it enough to prevent the sowing of seed.

April 4, 1932. Cloudy in A.M.; warm and clear in the afternoon (April 5 ^{clear} warm and ^{at evening} rainy).

April 6, 1932 Clear and warm all day.

April 8 " " " " " "

April 9 " " " " " "

April 11 Clear and warm until sundown, when a cold wind sprang up and the fog formation came rolling over the crest of the ridge (see top of this page).

April 13 Cool and cloudy when we arrived,

Weather Record - Agassiz Park 12.
Rams

with a slight suggestion of a drizzle.
At about 12:30 P.M. the clouds
had rolled in thicker, obscuring the
sun, and at intervals from then
on a heavy drizzle changing
sometimes to a light rain,
momentarily, drenched the earth.
This phenomenon was precisely
similar to an earlier one
mentioned ^(see ante) except that it was
heavier and wet the ^{lower garden} soil thoroughly
to a depth of a half inch - in other
words it did more good to sprouting
plants than did the other. Just as
on that other occasion, when we
descended the hill at 5:15 P.M.
and looked back there was a
heavy shroud of clouds covering
the ridge (and enveloping the
quail country), cut off sharply
at a certain level, leaving the
air relatively clear below, and
the sky much less clouded above
the Cayland region. It had
buzzled down at Mount Park
too (and also at Berkeley), but
to a much lesser extent than

Peather Record - Alpine
Buck Ranch.

13.

in the mountains. About 5
P.M. it cleared up, both in
the foothills and up at the
great mesa as well; seemingly
the rain was over for the day.

April 15, 1932.

Cool and clear.

April 16, 1932

Warm and clear

April 17.

Cool and somewhat overcast
until about 3 P.M., the clouds
dimming the sun at irregular
intervals until about that time,
after which it cleared up.

April 18

Warm and clear.

April 20

Cold and Windy, the sun being
obscured, fitfully, by sudden
masses of clouds which hung more
over the mountains than over the
Santa Clara Valley below. We are on
the edge of a storm which has passed
just to the east.

April 22

No rain since above, but some kind of weather.

April 23.

As above, but more clouds and less
wind, part of the time (afternoon), there
being none. Stars out at night, in southern
part of the sky; fog and clouds to the
north (the n.-s. ridge not being the
dividing line this time).

April 24.

Last night it began to rain at

Weather Record, Alpine
Creek Ranch.

14.

12 o'clock, and kept it up, for the most part, until about 6 A.M. - not a heavy rain, though. By 10 A.M. the sky was still partly with clouds, but the sun was out - partly. By ~~4~~⁴ P.M. it was clear, but cold and windy, with clouds to the north piling up again.

April 26, 1932. Cloudy ^{in the sky} all day, with the sun showing through them fitfully. At about 9:15 A.M. there was a heavy shower, which lasted only a few minutes, however, and which did not wet the ground enough to leave any traces. By 11 A.M. Several times in the afternoon there were heavy drizzles, each lasting for a few minutes.

April 27 Cloudy all day, but no rain either last night or today.

April 28 Sky filled with battered, far-flung storm clouds, with the sun shining through fitfully; no rain.

April 30 Cloudy, windy, with occasional brief squalls of rain, but no precipitation worthy of the name.

May 2 Cold, windy, overcast; the clouds have thickened up again, and the sun is for the most part hidden;

Weather Record - Alpine Creek Ranch.

15

still, there as here, no rain other
than a momentary drizzle.

May
~~April 3~~
~~May~~
~~April 4~~

about as above

" " " except that it was
clear for a short time after 4 P.M.,
but cold.

May
~~April 5~~

Clear, sunny, windy, cold.

May 8

Clear, warm.

May 10.

Bright Sunlight; about the
hottest day we've had this year;
78.0 F at noon.

May 11

As yesterday.

May 12

" "

13

" " but not quite so warm.

14

" " " " " " " "

15

" " " " " " " "

May 16

May 17

Too High fog, or clouds, all day,
rendering the temperature much
lower than during previous days.

18

As yesterday. The fog in question
is a high fog and does not
wet vegetation, at least at the
level on the hills where the G.D.
is, and I doubt if it does
anywhere. No danger to possible
young quail, in other words.
On the other hand it prevents

Weather Record - 16
Alpine Creek Ranch

the drying of the vegetation.

May 18 - Sunny but also somewhat
windy so that it was not very
warm. Just a dusk a brief mist
came up, threatening a drizzle,
but it was gone by 9 P.M.

May 19 Warm, sunny, somewhat
breezy.

May 20 Cloudy alternating with fitful
sunlight and light showers;
part of the time cold and windy.
Nearly a half inch of water has
collected in my plates cups and
cans left out since yesterday
noon.

May 21 Cloudy, alternating with fitful
sunlight, but mostly cloudy. Showers
during the night.

May 22 Warm and clear

May 23

" " "
Buster was certainly right
about the retardedness of the season
up here, as compared with the
valley below. Down there they
have cut their hay all through
the Mendocino region during
the last ten days, and all

Weather Record 17
Alpine Creek Ranch.

the standing grass is dry and withered and yellow - and gone to seed. Up here all is green and lush and in full flower, except on the most exposed slopes, where the grass is beginning to brown and most of the flowers have gone to seed.

May 24. Warm - clear - a summer heat, in fact.

May 25 as yesterday

May 26

May 27. Very different - cold, with a heavy fog in the mts (not amounting to a drizzle, however) and thick clouds in the valley and Bay region generally. Rain threatens.

May 28 - Cold, windy (somewhat) drizzly; like yesterday only more so

May 29. Intermittent but rather hard rains last night, continuing through the day until about 4 p.m., when the clouds broke up somewhat.

May 31 Sunny, but cold and windy, with clouds piling up over the ridge, from the west, at

Weather Record Alpine Creek Ranch

18.

- evening.
- June 1 Cold, cloudy all day long.
- June 2 Cold and cloudy all night, until ab. 9 P.M. when a cold wind sprang up and blew the clouds away. This wind continued all day until about 4 P.M. when it ceased and a fog rolled in, thick and clammy, this latter holding on to the present hour (11 P.M.)
- June 3 Clear and warm, or hot, rather.
- June 6 Clear and moderately cool.
- June 7 Clear and warm.
- June 8 " " hot
- June 9 " " " although tempered somewhat by a breeze.
- June 12. Warm and sunny.
- June 13 Cold and sunny all morning and up until about 3:30 P.M. when a high fog came in, a wind sprang up, and it became cold.
- June 14 12:30 P.M. I called up the Alp. Cr. Ranch and they said that it had rained quite a bit there this

19.

~~Lophortyx californicus~~
Weather Report - Alpine Creek Ranch.

morning, although it ~~was~~
beginning to clear at the present
time. It had rained enough so
that they did not advise coming
up the Los Gamos Road. This
kind of weather is (theoretically)
bad for ^{young} quail. Shall have to check up
on the population there soon. Of
course it might take more than
half a day of such rain to really
harm the quail populations.

Summer is overtaking even this
mountain country now. On the open
hillside pastures everywhere now
the grass is brown and the flowers
have gone to seed (see plant collections
seed list). Only on the east facing
hill slopes is there green grass, as,
for example, around the Q.D.,
and since there are only a few
east-facing hill slopes that are not
covered with trees and brush, such
green areas are rare.

June 18/1932 - Clear and warm
June 19, 1932 - As above; somewhat hotter.
June 20 - Clear; hot
June 21 - As above
July 3 - Clear, warm upon my return.

Weather Record - Alpine Creek²⁰
Ranch

after being a desert since June 21,
I find that the desiccation of
summer has at last overtaken
even the feed patch and grounds
surrounding the Q.D., even though
they are shaded for a large part
of the day from the sun. A
single area of green still remains
inside the Q.D., directly in front
of the cabin, which casts its shadow
over this patch during a good
part of the afternoon.

July 4	Clear, hot
July 5	Clear, - hot
July 6	" "
July 7	" " ; the hottest day yet; 93°F in shade at 3:15 P.M. !

July 8 Today was even hotter than
yesterday, by much. I should
mention that yesterday, in traveling
from Menlo Park to San Mateo,
I found it comparatively cool
as soon as I got down from
the mountains, into Menlo
Park. Coming back up to the
Alp. Cr. Ranch, on the return,

Weather Record - Algenie Creek
Ranch.

21

was like walking into an oven.
This is the first time I have
ever found it cooler in the
valley than in the mts; must
have something to do with
the air currents.

July 9 Weather changed enormously
during the night. In the
~~morning~~ ^{forenoon} it was cold and very
windy, in the late afternoon
a heavy mist drifted in from
San Francisco, and made it
still colder, although the wind had
died down. About 9 P.M. the
mist cleared and it was merely
cool. (See temperature chart).

July 10. Cool and ~~windy~~ all day, although
without fog; wind in late
afternoon.

July 18 Today has been cold, somewhat windy,
and very misty. The mist settles on
the grass and makes it damp
enough to wet ones shoes. Buster
McLellan says that up at the top
of the mountain it rained
slightly, so that the ^{road} roads became
slippery and several people

Weather Record

Alpine Creek Ranch 22

got stuck with their cars. Dawn here where we are the mists have not been affected, although the mist seems to have been laid (by the condensing of moisture upon the ground, not by actual precipitation, I believe).

July 19 Cool, clear.

July 20 Quite warm, clear.

July 21 - Fairly cool, clear.

July 22

23

24

25

"

"

"

"

"

"

"

"

Because a fog comes over the gap at night, and although not actually reaching S. to here, yet

cools the winds.

Aug 17 - Fair, warm.

Aug 18 - Clear, fairly warm (87.0° F at noon), but not as warm as it has been.

Aug 22 - ^{clear} Warm in late afternoon, so probably hot earlier.

Aug 23 Clear, hot (94.0 at 11 A.M.).

Aug 24 Clear, hot

Aug 25 Clear, hot

Aug 29 - Clear, but cool and with a breeze - autumn weather; not summer weather. Slightly chilly at night

Aug 30 - As yesterday; 77° F at 9:40 A.M.,

Photos taken of the fog.

Weather Record - Alpine
Creek Ranch

23

80°F at 11:35 A.M. The back of
the summer weather seems to have
been broken.

Aug 31 - Warmer than yesterday; clear.

Sept 1 - Hot, clear

Sept 3

Sept 4

Sept 5. Clear, slightly cooler (see temp.
chart).

Sept 6. As above.

Sept 12 - Cool, though, clear. (It must
have been cool on the 10th & 11th
also, and excessively hot on the
9th).

Sept 13 Clear but cool.

See Log on p. 35 for remarks

on presence of dew.

Sept 16 - The fog rolled over the hills
in one enormous, far-flung
billow this evening (7 P.M.). This
must help the quail to some extent.
The fog has been doing this for the
last 7 days, at least.

Sept 17 - Cool, in fact slightly chilly.
with a breeze. Also, it was foggy
almost all day.

Sept 18 - Cool, clear (only 69.0 at 9:30). Last

Weather Record - 24.
Alpine Creek Ranch.

night there was a heavy mist,
and it was cold enough so that
2 blankets were not enough inside
the shack.

Sept 19 - Clear and cool

Sept 20 " " "

Sept 23 " " "

Sept 24 - " " not quite so cool.

Sept 25 " but warmer still

~~Oct~~ Sept 30 - Really "clear", but nevertheless has
distinctly hazy, as it has been
indeed on several previous
days. On this account noticeably
cool

Oct 1 - Clear but hazy; cool.

Oct 2 - Clear but hazy; cool from
early morning until ab. 10 A.M.,
when it became warm and
sultry, cooling off again about
4:30 P.M.

Oct 4 - Overcast in P.M., with dense
fog all night; almost cold.

Oct 5. Overcast and foggy all day;
cool.

Oct 8, 1932 Clear but hazy; cool

Oct 9 ditto

Oct 14 - Cool, clear

Oct 15 - Cooler still, clear, windy (only 70.0 at
noon).

Weather Record -
Alpine Creek Ranch

25.

Oct 19 - Clear, cool. Yesterday, Carl Bolanger tells me, it was very cloudy and looked like rain at the top of the ridge, indeed, it did sprinkle for a moment, although not enough to do any good.

Oct 20 - Cool, clear, slightly windy -

Oct 22 - Cool, clear.

Oct 27 - Cool, clear

Oct 29 - Chilly, hazy, windless, high thin clouds overhead.

Oct 30 - Cool, clear, windless.

Nov 4 - Cool, overcast, at least in evening.

It rained just a little for the first time this year, on Nov 2 - hardly enough to settle the dust ~~on the ground~~, however.

Nov 5 - Last night it rained a little for a short time - enough to make a thin ^{shaggy} film on the sods, but no more. All day it was cloudy, with the sun shining through at intervals; cool.

Nov 6 - Clear, cool

Nov 23 - Clear, cool

Nov 24 - Clear, cool

Nov 25 - Somewhat overcast, cool

It has not yet rained this year, the sprinkle of Nov 2 not having

Weather Record.

26.

Algine Co. Ranch.

been enough to start the new grass
at all.

Nov 26, 1932 Cold, overcast part of the time,
but especially toward evening

Nov 27, 1932. Windy last night and
at the same time overcast. To
day it became fairly black, the
clouds lowered so and from
time to time fitful brief squalls
of rain swept past. On top the ridge
the rain, which was accompanied
by a drizzling mist, was enough
to wet the road slightly - enough
to make a thin slippery film, but
down at the G.T. it was not
enough to thoroughly settle the
dust, and at Men's Park there
was no rain or mist at all,
just clouds. The wind blew quite
hard much of the time.

Nov 28 - Cold, windy, overcast

Nov 29 Rain since 4:30 A.M., cold, windy.
The rain has been light, but fairly
steady, and has produced a thoroughly
greening mud, for the first time this
year.

Nov 30 Cold and damp following the storm.

Weather Record
Alpine Creek Ranch

27

Clouds not entirely vanished, but the sun was out, albeit with not much heating effect.

December 1, 1932. Bright and clear, but cold, with much mud still undried.

Dec. 3, 1932 Bright & clear but still muddy; also cold

Dec 3, 1932. As yesterday

Dec 4, 1932 " " but somewhat less

Dec 15 ^{muddy} This is the second day of warm weather after the record-breaking cold snap. There is still lots of snow on the ground, and it is only a little above freezing, but not nearly so cold as previously.

This cold snap was more severe than any since the records of the U.S. Weather Bureau were commenced (ab. 40 years ago). Pipes all over the ranch burst; the plumbing in the governor's house was demolished (the sink even fell to the floor!), including even the main line from the storage tank. On Sunday

Weather Record - Alpine
Creek Ranch.

28

morning the temperature was only
5° F at the government, and was
probably 0° F during the preceding
night. Only a moderate snow-
fall was present, however (4"

Sunday, lesser amounts other days)
which caused little hardship to
stock - the more cold not being
harmful. This cold spell started
about Dec. 8th and terminated
the night of the 12th, the next day
being noticeably warmer.

Dec 16. Warm (51 at 12:00) The snow is
rapidly melting. It is clearing
up as though to rain. Started about ^{noon} ~~about~~ ^{on foot}

See "Notes on the Presence of Quail
Foods" section p. 5.

Dec 17-18 - light rains (Duras on Oakland)

Dec 19 no rain (.)

Dec 20 Cloudy and misty, at least in
the afternoon; rain predicted by
the weather bureau

Dec. 22 Cool, clear, wet from the recent storm

Dec 23 Clear, cold, freezing weather at
night.

Dec 24 Clear, cool; heavy frost at night.

Dec 25 Clear, cool

Weather Record - Alpine
Creek Ranch

29

Dec 26, 1932 Warm and clear until
about 3 P.M. when it clouded
up fast, although still warm.
A thick mist had settled by
7 P.M. Rain seems to threaten.

Dec 27 No rain; it cleared again.

Dec 28 Clear, fairly warm

Dec 29 Clear, warm

Dec 30

Dec 31 Clear until ab. 3 P.M., when it
clouded up. Began to rain lightly
at 6 P.M. but by 9 it had
cleared completely. The night
turned suddenly cold (min.
temp. ^{30.0} ~~34.0~~ °F).

Jan 1, 1932. Clear, warm (max. temp.
76 °F).

Jan 2 - Cloudy, warm.

Jan 4 - Clear, warm. Rain yester-
day, but only light showers.

Jan 5 - Clear, warm (max. 82 °F)

Jan 6 - Quite warm; clear

Jan 7

Jan 8

Jan 11 Cool, clear (has been clear since
Jan 8).

Jan 12 Warm, clear

Jan 13 The unprecedented cold
wave of December (see p. 28, I think)



Weather Record - Alpine
Creek Ranch.

30

has killed the majority of the amalgam trees on the Ranch, also whole stands on the hills back of the U. C. campus. The leaves are entirely dead, giving the trees a curious, unmounted, pallid, straw-colored appearance, and Buster Mc Lellan says that the trees themselves are dead, above ground. He says a tree specialist came up to the Ranch and bored into the trees, taking samples and that he declared they were dead. Only certain species were killed; others, more hardy, showed no effects, so that wherever whole stands are killed in some places here, in other places a few to many still healthy trees will show up dark green among their more sensitive relatives.

Cold and windy (Buster said) today until noon; warm and clear from 3 P.M. on.

Jan. 14 Warm, clear until ab. 3 P.M. when it clouded up heavily, sprinkled a few drops, then about 6:30 P.M. cleared up, turned cold and grew windy.

Weather Record - Alpine ³¹
Creek Ranch.

Jan 15 Cloudy, cold, slight rain for
a half hour or more before
10 A.M. when I left.

Jan 17. Cloudy, windy, cold (ab. 33° F.
at 3 P.M.), promising rain.
Rained Jan 18 (I was not there).

Jan 20. Rain below Pashy Place and,
snow (several inches) at Pashy Place
and above. It did not last more
than a day, though. (Rained and
snowed yesterday, too).

Jan 21 - Partly clear, warm, no
precipitation.

Jan 22 (not there, but it rained ^{and snowed} ~~in~~ morning in Oakland).

Jan 24 - Steady, hard rain. (Rained
yesterday too, at least in Oakland).

Jan 25 - Unsettled weather; rain
at least in the afternoon.

Jan 29 - Has rained part or all of each
day since the 25th. Cleared up this
afternoon momentarily; rain in
the morning.

Jan 30 - Clearing but still quite
overcast. It is noticeable that even
when it has cleared along most
of the range lying north of the

Weather Record - Alpine Creek Ranch

32.

Alpine Creek Ranch, so that the sun is shining, it will still be cloudy, gloomy, and cold on the hilltops of the Alp. Cr., and more or less to the south also. This is because the Alp. Cr. R., at the repair of the government house and the Pashy Place, is higher in elevation than the rest of the ridge lying to the north. Thus it was today. The valley smiled in the sun, but a sinister pyramid of black lowering cloud lay piled upon the ridge at the Pashy Place, and there it was chilly, damp, and foreboding.

Feb 2. Sun shining, but a haze renders its brilliance noticeably dim; cool; strong wind blowing on top of ridge.

Feb. 3 Clear, warm, spring like

Feb 4

Feb 5

Feb 6

Feb. 8 Hazy, cool, threatening a storm in future

Feb. 9 " " still threatening; more cloudy.

Feb 14 Warm, sunny, spring like (Rained from about Feb. 11^{morning} until about

Reather Record, Alpine Creek
Ranch.

33

Feb. 12 evening.

Feb. 16. Part of the time overcast, part of the time sunny.

18 Warm, springlike, sunny

19 Housatonic R.

20 noon meeting.

2/ all day until 6 PM?

22 noon - end of day?

23 all day ?

24 all day

25 ~~alloy with~~

26

27 ~~Handwritten scribbles~~

28 . . . all day until 6 P.M.

Mar 2 about 2 hrs in
afternoon

3 noon-rest of day

4 .. all day

5.

6 Overcast part of the day, but warm

7

8 Warm, springlike, sunny. We
are about $5\frac{1}{2}$ " behind the normal
rain fall for this time of year. The
ground is much drier than usual
for this time of year, also. 3:30 p.m.
out of day.

9 Warm, springlike, clouding up
toward evening all day

Weather Record, Gelp. Creek Ranch

34.

		Attendance
Mar. 10	As yesterday	all day
Mar 11	The vaguely threatened rain looms more imminent today. It is cloudy, cold, windy.	all day until 3:30 p.m.
Mar 12.	(not there) Rain in Oakland today and last night.	
13	Shawers	
14	Rain in afternoon	4 p.m. - 9 p.m.
15	Shawers	
16	Shawers	3 p.m. - 6:30 p.m.
17	Clear, warm	6 p.m. - rest of night.
18	" "	all day
19	" "	all day until 3 p.m. then off
20	Rained Clear, cold, windy	(not present)
21	Clear, cold, windy	all day until 5:30 p.m.
22	" cool	6 p.m. - rest of night
23	Shawers last night and during the morning; cool, windy, all day; clear in evening.	
24-	Clear, warm, springlike.	afternoon
25	Cloudy, cool	all day
26	Light rains	all day until evening
27	" "	afternoon
28	" "	all day
29	Clear, warm	afternoon
30	" "	all day
31	" "	all day

Weather Record Alp. Or. Ranch

35

April 1 Clear, warm

2 " "

3 " "

4 " "

5 Cool

6 Cloudy, cold, windy

7 " "

8 Clear, warm, spring like

9 " "

10 " "

11 Clear, warm, spring like

~~12~~

13 Clear, warm

14 " "

15 Cloudy, cold, no rain

16 Cloudy, cold, windy, a few gusts of
liquid sunshine

18 fairly warm (?)

20 " "

21 " "

23 Warm, hazy

24 About, but very chilly, cloudy, in

Berkeley

The unusual cold weather which
we have had recently may result
in a somewhat delayed commencement
of nesting activities with quail. The

Weather Record
Alp. Cr. Ranch

36

dates this year should be checked with those of last year.

In the late afternoon the ocean fog inundates the Mindego Quail country like a vast, level, cottony tidal wave, remaining, doubtless, all night, and steeping all ~~part~~ but the tops of one or two high mountains in a chill, white, dense envelope of moisture. This daily invasion of chill, moisture-laden air keeps the hills green, provides the correct environment for red-woods, Douglas firs etc in the ravines - but, may sometimes cause the death of young quail, conveniently.

April 25 clear

April 26 - cold, cloudy

April 27

April 28 half an inch of rain, according to Buster Mc Lellan (corroborated by buckets containing rain water, at Q.D.)

April 29 - fair, cool, windy

April 30 - fair, cool.

May 1 - Rain, possibly ~~4~~ 1/2 inch

Peathers Record
Alp. Cr. Ranch

37

May 2 Fair, cold, windy

May 3 " " " Heavy fogs
envelope the west side of the
ridge, ^{in the early afternoon} making it black,
icy, and dismal; the east
side has the sun during
this period, but is windy
and cool. This sort of
weather seems to be typical
for this time of the year.
Buster McTellan says the same.

May 4 Clear, cool

May 5 " "

May 6 Clouding up ^{at noon} ~~in A.M.~~ light
rains at night

May 7 Rain until noon, partially
clearing in P.M.

May 8. Clouding up and bright,
~~alternately~~; rain in late
night.

May 9. Rain in early morning,
fitful, showery weather

May 10. Rain in early morning - cloudy
and sunny by turns the rest of the day

May 11. High fog in A.M.

May 12 Cloudy, cool



Weather Record
Alp. C. Ranch

38

May 13 - Sunny, fairly warm, according
to Mrs. McEllan

May 14 - Sunny in A.M., but clouding
up and becoming cold again
after lunch.

May 15 - Cloudy, cold

May 16 " "

May 17 " " , liquid sunshine,
almost rain in the A.M.,
fitfully sunny in P.M.,
warm in evening.

May 18 Sunny in early A.M. but
quickly becoming overcast and
cool. This interminable
chill, forbidding winter must
have delayed the spring
materially. Talking with a
man just up from Los Angeles, ^{May 13}
I learned that the same cold, cloudy
weather had prevailed down there
also.

Sunny and warm again in P.M.

May 19 - Fair and warm, a fine spring
day, at last.

May 20, Fair until about 6 P.M., when
it clouded up.

May 21 - Fair in early A.M. (5). Cloudy,

Weather Conditions
Alp. Co. Ranch.

39

cold, and windy all day.

May 22 - Fair and warm

May 23 - Cool, I think

May 24 - Warm, fair

May 25 " "

May 26 " "

May 27 Hot

May 28 Unusually hot. Buster says

these hot spells (as May 24-28)
do not usually last more than
three or four days, being ter-
minated by a foggy, cool
spell. Sure enough, in
the evening to night a fog
rolled in.

May 29 - Cooler

May 30 as yesterday

May 31 - Decidedly cool; fog in
evening, temp 43 at 8:30 P.M.

June 1 - Cool, sunny but clouds
scattered, though sky, part of time
decidedly chilly.

June 2 - as above.

June 3

" "

June 4 - A few drops fell but otherwise
as above.

June 5 Cloudy, cold.

June 6 - 12 Warm, bright; hot in

Weather Conditions
Alp. C. Ranch

40

fact. Summer has come at last.
They are commencing to cut the
earliest hay up here. much of it
is not yet ready, however.

June 14 - Very hot; summer weather.

June 15 - Considerably cooler (max. 92.5
as against 102.0 for yesterday).

16 Cool, fog has come in

17 " fog still here

18 " " " "

19 Cool - fog still here (on W. slope of
ridge).

20 " " " "

21 " " " "

22 " " " "

23 " " " "

24 " " " "

25 " " " "

26 Still cooler, fog heavier at night and
earlier appearing

27 Very foggy and cool; chilly, in
fact. This prolonged foggyness
is phenomenal. The fog
never left all day, as it usually
does.

28 Heavy fog

29 " " "

30 " " "

July 1 " " "

Weather Conditions
Alg. C. Ranch.

41

- July 2 Fog
" 3 Fog
" 4 Much warmer than heretofore;
only a little fog at night of
July 3.
" 5 Warm
" 6 Quite hot. Fog is present on
west side of the ridge, but is
so low down that it crosses
the ridge ~~only~~ at a few
low saddles
" 7 Warm
" 8 Slightly cooler, a little more
fog last night. All in all
the weather, so far this
month, has been phenom-
enally cool.
" 9 Warm, not much fog
" 10 Warmer
In connection with Theodore E. T. S., Sr.
tells me that last May was the coldest
on record ^{in Bay Region + Calif. generally} since the establishment of
the Weather Bureau (ab. 52 yrs ago)
" 11 Hot - maximum 114.5 in
- tal? drying grass where quail
would be when not in shade.
" 12 Very hot

Weather Conditions 42
alp. C. Ranch

- July 13 - cooler
 " 14 as above
 " 15 Cool; fog came down even
 to the Q. S. level last night and
 was still present at 7:30 A.M.,
 making the grass wet.
 July 16 Fairly hot by midday
 17 Not there all day.
 18 Very hot
 19 " "
 20 " "
 21 " "
 22 Cooler; more fog
 23 Cool, fog last night
 24 Cool; last night there was heavy
 fog which hung like a
 cloud around the Q. S. even
 at 6:30 A.M.
 25 - Hot
 26 - Very hot
 27 - Last night was the hottest
 I have ever known here
 (see Lophortyx p. 587). Hot
 as Pappet during the day.
 28 - Cooler
 29 Cool (much fog on ridge) windy
 30 " as above
 31 " and windy, much fog.

Weather Conditions
also C. Ranch.

43

Sept 1 Cool, clear.

Sept 2 " " "

The summer is definitely over. The very air is noticeably subtly different, it feels fresher, chillier, more translucent. The ^{night} fogs are thicker, colder, ^{even} the noon-days cool. All grasses and all but the late summer (characteristic) flowers are withered and gone. Autumn is here.

Sept 8 - Cool, clear, windy; chilly in evening.

Sept 9 Cool, clear; fog overhead (high) in eve.

Sept 10 " " " " " " " " " " " "

Sept 12 " " " " " " " " " " " "

Sept 13 Warmer, less fog.

Sept 14-16 " " "

Sept 17 Rain clouds over bay region; heavy fog, at times, approaching a light rain, on top of ridge with gale of wind (warmer air sheltered east slope where Q. I. is located).

Sept 18 Cool, clear

Sept 19 " " "

20 " " "

21 " " "

22 " " "

23 Cool, slightly cloudy in

Weather Conditions
Alp. C. Parrish

44

A.M., clearing up in P.M.
and becoming foggy, almost
drizzly. [Sept 24 - cloudy, possibly
drizzly, too]. This is.

Sept 30, 1933 Clear; warmer than usual,
in fact uncomfortably so.

~~Sept~~ Oct 5, 1933. Clear; hot (123.5 in grass),
representing a recurrence of summer
conditions

Oct 6. Hot in A.M., cooling in P.M. due
to fog invasion.

Oct 7. Heavy fog last night, even around
Q.D.; consequently cool today.

Oct 8 - Again heavy fog in night,
drenching the shrubbery; cool
in day.

Oct 11 - Cool, clear

Oct 13-15 " "

Oct 16 Very hot, an all time October record
in S. F. of 87°F, in Oakland also record ^{84°F, 91°F} breaking

Oct 17. Hottest Oct. for many years - 81°F;
"no relief for at least 24 hrs. is in
prospect". [From Oak. Tribune, Oct 17].

Oct 19 - Cooler, but still warm for October

Oct 21 " " " "

Oct 22 " " " "

Oct 26 " " " "

Oct 27 Cloudy, cold, fog over mts.

Environi mental Conditions -

Changes In.

Charges In.
Apine Creek Ranch

- ① 9/28/31 Mc Lellan is plowing up the corn field (see map), thereby removing a measurable quantity of weed growth in the territory of the corn field "corn" of ^{done 7-24-1932} ~~the~~ ^{the} ~~territory~~ ^{territory} to grow the orchard, too, which is waist-deep in weeds, including tar weed, at the present time.
- ② 12/14/31 The ground mentioned above has been sown, also the deer pasture (wheat, barley, oats).
- ③ See under Lophortyx, about Feb(?) for date of sowing of the barley fields
- ④ May 26^(ab) Mc Lellan cut the barley in the field just below the R.P. The other barley fields are not yet cut
- ⑤ May 31. Men started to work on clearing out the second growth oak woods which cover the e. slope of the ranch so thickly as to prevent growth of weeds and other quail foods. They are working at the Buck House woods at present, chopping down all the oaks and blasting out the roots.

including 12/14/31 The ground mentioned above has been
sown, also the deer pasture (wheat, barley, oats).

(3) See under *Lophortyx*, about Feb(?) for date of saving
of the Carley fields

④ May 26^(ab) Mc Lellan cut the Cranley in the field just below the R.D. The other Cranley fields are not yet cut

5) May 31. Men started to work on clearing out the second growth oak woods which cover the e. slope of the ranch so thickly as to prevent growth of weeds and other grain crops. They are working at the Buck House woods at present, chopping down all the oaks and blasting out the roots.

Changes in environmental² conditions Alpine Creek Ranch.

This clearing of the heavily
shaded, almost impenetrable
land and its transformation
into well-watered pasture,
should materially increase
the numbers of quail another
year. Photos of the land before
clearing, and some that had
just been cleared, taken June 2.
Also some views of ideal quail
land on the "upper pasture" taken
May 31.

Photos

Sept 25 - Much of the land down
hill from the road leading from
the bunk house to the old barn
has now been cleared; also some
land down hill from the
Q.D., on the opposite side of
the canyon. Photos taken of
the first-mentioned area.

November 6, 1932. Nov 2 it sprinkled a little,
this being the first rain of the
year. On Nov 5 it rained lightly
for a short time during the
night, but only enough to make
a thin film of moisture on the
surface of the ground - hardly

Photos.
May 31, 1932 1
June 2

Changes in environmental 3.
conditions - also L. P.

more than enough to make ones shoes slightly gummy. So far there has, of course, been no eruption of green vegetation ~~to~~ in response to this slight wetting. Even if these two sprinkles prove to be sufficient to start the grass seeds sprouting (which is problematical) the seeds will not appear until about ten days after the wetting - at least it has been my experience this last month but it took the grass, etc. seeds about 10 days to appear above ground after a very thorough soaking with a lawn sprinkler.

A search over several acres of quail range showed no green sprouts of a sort suitable for quail - only tough *Baccharis*, *Antennaria*, etc. sprouts. Where the summering pool drainage ditch passes through the otherwise dry country, though, there is a close carpet of young grass.

November 26, 1932 There has still been no real rain, and consequently the new vegetation has not yet appeared. See *Lophanthus*, this date, for account of

Notes on the Presence of Quail
Flocks at the Alpine Creek Ranch. 1.

1. About a month ago (see notes on *Agelaius*) there was a considerable acorn crop, as indicated by the activities of the jays.

19, 1931 2. Snow berries are very large and numerous by the bath house at present. (specimen collected at Alpine Ranch)

noted as
was alone. 3. Rose hips were present, although not in great abundance, on the wild rose bushes in the cornfield.

on 4, 1932 4. *Baccharis* seeds are become plentiful, or rather, because I don't know when they ripen, the pappus is commencing to burst forth so that when one shakes the bushes the seed falls off and floats away. The bushes have a wiry look on account of this pappus, which was not the case just before this prolonged rain. (specimen collected)

March 21, 1932. See notes on weather, especially recent rains. Due to this heavy and protracted precipitation the entire aspect of the hills has been noticeably changed; grass and weeds have within the last two weeks attained a good start, amounting even to a luxuriant growth along the margins of springs and in other unusually wet situations. This growth has been most rapid during

Notes on the Presence of Quail 2.
Food on the Agave Bush
Ranch.

the period of warmth and sunshine
which has followed the rains.

On open well drained slopes the
grass and weeds range from an inch
or two to several inches in height;
in the thickets the roses, vines, and
passion vine also, are just commencing
to leaf out vigorously. The following
flowers have appeared within
the last few days: Mustard (already
in flower in particularly moist
sections); Ranunculus (here and
there in flower).*

An occasional Baccharis bush
shows signs, but for the most
part the bushes are not in flower
or in seed just now. Donald McLean
says that Baccharis flowers and
seeds irregularly through out the
year.

April 20, 1932. The past two weeks has represented
a high peak (at least so far) in the
growth of grass and flowers. In the
moister, shaded places the grass is
12-14 inches tall. The barley field
by the G. I. (= quail enclosure) is a
^{green} ~~spangled~~ sea spangled with butter
cups which grow so closely together

Notes on the presence of Quail 3.
Foods on the Alpine Creek
Ranch.

as to such in most cases. Other
flowers are out - as filaree, mustard
in abundance, Dodecatheon, etc. From
this time on I shall list foodplants
~~in order~~ as to their abundance, time
of seeding, etc.

1. Dodecatheon - in flower - common
2. Ranunculus - in flower; some in
seed as well (specimen collected).
~~very abundant~~
3. Medicago lupida - in flower; also in
seed. Very abundant
4. Lysurus - just commencing, apparently
(one plant collected). Not yet common.
5. Echinocystis - Vines just growing;
some in flower. Common.
6. Erodium - common - in flower.
7. Lomatium - fairly common; plants
small, but in flower.
8. Anemone - fairly common; in
flower.
9. Brassica - Abundant. In flower, and
seed, both.

No barchans seen in bloom at this
time.

May 12 - See under Lophochys sp. 161 - 162 for
comments on the abundance of flowers
at the height of the season.

4.

Notes on the Presence of
Quail Feeds on the Alpine
Creek Ranch.

June 14, 1932.

Instead of writing pages of detail, listing all the plants which I have collected, together with their flowering and seeding times, I will refer to the table of about 95 species (to date) where all this is given in condensed form; also to the botanical collections and seed collections.

It suffices it to say that this is very nearly, or quite, the height of the spring flower, seeding time. Oct 15, 1932. And this is about the height of the fall flower seeding time. *Pinks*, the tarweeds, bird's beak, *Datura*, *Lactuca*, *Eriogonum*, *Rhamnus*, *Lonicera*, *Aster*, etc. (See plant collection).

November 6 - See under "Changes in environmental conditions" for notes on appearance (or lack of it) of winter green vegetation, a note which should have appeared here.


Ditto Nov. 26.

Nov 29 - Our first decent rain Mr. Kerrigan (near by farmer) says that green

Notes on the Breeding of Quail 5.
Lands on the Alpine Creek Ranch

vegetation should have started to appear a month ago, whereas it hasn't even appeared yet.

Dec 16, 1932

~~most~~ The first sprouts of native vegetation are visible now that the snow has left, and disclosed them. They are not grasses, but some other ^{decid.} ~~perennial~~, for their shape is like this . Evidently they appear before the grasses do in the winter and spring. They are not big enough, or numerous enough, to make the earth look even slightly green, but they are pretty uniformly distributed, and they could provide an inexhaustible supply of food for quail.

Of course these sprouts have been up several days (2-4?) in order to be so noticeable everywhere. The cold weather - below freezing constantly - which ~~it~~ we have had for the last week (see under weather notes) has not only failed to kill them but has apparently not even held them back. This is probably because the snow has acted as a blanket.

Dec 20. Green sprouting plants are now

6.

Notes on the Presence of
Quail Foods on the Alpine Truck
Ranch

evident everywhere - especially in the E. F. Lake and the pastures (both near the Q. D. and at the Pearly Place. Some few plants are as much $2\frac{1}{2}$ -1 inch high!

Feb. 6, 1933. Green grass now mantles the hills. It is still short, and has not - at the higher altitudes - yet made the hills a vivid green, but it is long enough and abundant enough to provide a limited pasturage for cattle.

March 19, 1933. The grass ^{and weeds} ~~has~~ turned the hills a vivid green, but neither are very long as yet on the cold, dark, eastward-facing slopes such as that upon which the Q. D. is located. Westward facing slopes, as Mirdego, Nelson's, have luxuriant grass (3" long and more), and a very few scattered flowers.

This whole region is, as usual, much behind the warmer, low lying, adjacent regions. Mustard and wild radish are two feet high at Mills College, Oakland, and filaree is already in fruit (the fruit is long, too, not short and small). In Berkeley wild flowers have

Notes on the Presence of Quail
Foods on the Alpine Creek
Ranch

7

been in evidence for about two weeks; here only a few stray mustard plants are in bloom (at Q.D.).

At Pacific Grove Mr. Carruth of Mills College, got the following flowers two weeks ago: Monkey flower, buttercup, wild radish, mustard.

April 11, 1933. Buttercups are just commencing to blossom, sparingly, around Q.D. territory. On the warm, Pacific side of the ridge (Mendezo Quail Range) Lupine, Linanthus, Calendula, Nemophila, Alfilaria, and Escholtzia⁽²⁴⁾ are common in blossom.

May 10, 1933. Buttercups are now in full bloom in the barley field, but not yet out on the shady, colder, Q.D. ground; miner's lettuce, a small parsley, Dodecatheon, a Bursaria or similar plant, wild mustard, fiddleneck, are now common. The grass - wild oats, rip out, is about 8" tall.

June 5, 1933 - On account of the lateness of the season (prolonged cold weather) the grass and flowers are still not quite at their period of maximum development. Flowers are



Notes on the Preserve of 8
Quail Land on the Alpine
Coele Ranch.

everywhere, but hay will not be ready for a week. Even in the valley (around Menlo Park) haying is at its height; out by Dumbarton Bridge the growing season is nearly over, hay all cut.

June 12, 1933 - This is the height of the growing season; flowers are in full bloom, the grass is heading out, most plants are at the height of their luxuriance; no seeds to speak of yet; nothing as yet drying up - this refers to the majority of the Q.D. On west-facing slopes, and in exposed places elsewhere, lupine is coming into seed; *Achyrocline*, *Artemisia*, *Calandrinia*, some *Compositae*, have already produced seed, and the grass is drying

James Ralph III told me (as did also Buster McEllan) that his father (J. R. IV) used to drive about throwing out handfuls of wild flower seeds all over the ranch. He got the seed from a florist named Paine (S.P.?) in Glendale. This accounts for some of the variety, also the peculiar distributions of the flora here.

Summary of Experimental Quail Food Plantings

[X = eaten by quail]

Species	S = successful F = failure		Remarks	Date of Seeding	Date of Maturity
Field corn	S		Too cold and wet	Apr 26	Aug
Calif. Wild plums	moderately S	X	not right species	Mar 4	June 2
Common vetch	S?	X	probably grows well seeded earlier	Mar 21	2 little in Aug or July
Sour clover	S	X	Excellent with H ₂ O	Apr 2	Aug
Bur clover	F	X	grows well but not enough H ₂ O	Apr 2	Aug
Red top grass	F	X		Mar 21	Did not
Pearl Ryegrass	F	X		Mar 21	did not
Hog millet	S	X	quite handy	Apr 23	Aug 30?
Oats	F I think	X	Don't know; the wild grass was so thick	Feb 29	
Barley	S but see moderately	X sparingly	Excellent but poor quality	Mar 21	July?
Alfalfa	S F	X		Mar 23	new seed
Rye	S moderately	?		Feb 29	Aug
Wheat	F	X	Too wet Mr. Kellam says	Mar 21	Aug?
Purple vetch	S	X	Excellent	Feb 29	Aug
Domestic Ryegrass	F	X		Mar 4	did not
Rape	F	X	Needs too much H ₂ O	Mar 4	Only in Q. see from real
Sudan grass	F	X	weeds choked it out	Mar 2	did not
Buckwheat	S		but quail don't eat it.	Feb 28	Aug 15?



1.

Notes on Miscellaneous Processes and Results of Natural Selection.

1933 - An idea I have got from reading
Chandler, A.C., Introduction to Human
Parasitology (1930). : Perhaps the
sparseness of hairs in the immediate
vicinity of the anus of most mammals
has come about through natural selection,
fewer hairs meaning fewer adhering
tape worm and other parasite eggs;
lice and fleas thereby eating fewer
eggs, so that fewer intermediate
hosts (the lice and fleas) will be present
to re-infect the primary host again.

June 5, 1933. Why do bob-cat have tails
which are practically rudimentary
while other cats, as *Felis*, *Leo*^(? &), have
long tails? I see nothing so far (with
my tame *Lynx* kittens) in the habits
of the genus *Lynx* which makes a
tail more, or less, necessary than in
the case of *Felis*. Is the character perhaps
linked with some other character in
one genus but not in the other.

Why do cats instinctively (see
Lynx, my notes) bury their excrement
whereas dogs do not. If the matter
were of such vital sanitary importance
with the cats, why not with the

SUGGESTIONS AS TO COLLECTING

Use one serial set of field numbers, for all specimens (including "pick-ups", nests and eggs, etc.), continuing from last number. Number notebook pages from where left off previously.

Always enter altitude for each specimen both on tags and in notebooks; always give county as well as exact locality; for example: "3 mi. NE Lone Pine, 3700 ft., Inyo Co., Calif.". Note proper abbreviation for California. Attend minutely to proper punctuation.

Label every skeleton and salted skin as fully as a regularly made-up skin. Put a separate tag on every loose part of a skeleton. Use same field number on all parts belonging to one individual animal. Tie tags securely, three square knots.

Record data on all tags in following order (in 3 or 4 lines, as necessary): Sex, your field number, your name, locality; measurements, weight, date.

All miscellaneous material should bear labels stating to what species it pertains, with notebook page references. Nests and plants should have labels attached to specimens (not to container). Eggs should have labels placed within containers in which packed. Miscellaneous material should be packed with as great care as skins or skulls. Cheek pouch contents, feces, etc., should be placed in small envelopes or boxes, with labels inserted, and such containers packed in a stout box to prevent crushing.

In collecting specimens, keep improving technique; turn out smooth, symmetrical, firm skins of birds and mammals. If possible, keep all skins with you until thoroughly dry. In preparing for shipment, take special pains to pack specimens tightly so that they will not move lengthwise of the box. Much of smoothness and symmetry may be lost through loose packing.

In cleaning skulls of bird skins, avoid removing so much of the back end of the cranium as to loosen the articulations of the lower jaw. The lower mandible should be left in place so that the bill will close in

THE HISTORY OF THE

The history of the... (faint text)

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... (faint text)

... (faint text)

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... (faint text)

normal position, preferably without tying. If tying be necessary, do not draw thread so tight as to force lower mandible back out of normal position against upper. In birds larger than linnet, if leg bones be broken, replace with sticks so that feet remain firmly anchored to body. In birds larger than meadowlark use solid excelsior body; but avoid over stuffing; with larger birds aim to make a flattish skin. Be faithful in removing all fat and grease.

In mammals, in which skulls are saved separately, sew, with great care, the skull tag through the lower jaw -- not through eye socket, the muscles only, or the brain case. Put data (sex, collector's number and his initials) on one side of skull tag in ink, on other side in pencil. In cutting the head from neck, be careful not to injure the bones of the skull, including the condyles. In cutting off nasal cartilage do not cut so close to the skull as to clip the ends of the soft nasal bones.

It is our custom now to save mammal skulls in alcohol, 70 to 80%; alcohol should be kept up to strength, as with other alcoholics, and skulls should not be crowded. Especial care should be taken not to crowd big skulls into a jar with little ones, as the zygomata of the latter are liable to be broken.

If it be found necessary for any reason to save mammal skulls dry, the brains should be removed, after soaking in water 12 to 24 hours -- with great care in small mammals so as not to fracture any of the delicate bones. The brains may be loosened with a toothpick and be washed out with a syringe. Such skulls should be dried thoroughly before packing. If this is impossible, pack in a large quantity of cornmeal and this will prevent festering. Avoid use of containers which have had grease in them, and of tight containers such as coffee cans, unless skulls be perfectly dry.

In saving complete skeletons, or "body skeletons", remove most of the flesh in the large mammals, and dry thoroughly, but never in the sun (this also with skulls). With small species, keep the body as straight

as possible, not doubled up; bind fore legs back along sides of body, hind legs forward, with tail curled around one side. Use thread or twine, not wire. With birds, turn head backward over, or at side of, body, draw wings close to sides, bend legs under body, binding all in place with thread. This will save breakage and loss of parts during drying or storage until cleaned.

Preserve amphibians, reptiles, young of birds and mammals, and material of like nature, in formalin. Ordinarily mix one part full strength (40%) formalin with nine parts water. Vary this strength for different kinds of material and for different weather conditions. Inject each specimen with slightly stronger solution than is used for immersing it. Be sure that each specimen is cold and relaxed before placing in tank. Examine specimens at frequent intervals to see that they remain hard. Coil long specimens symmetrically.

In packing alcoholics, drain off fluid, wrapping in cheesecloth so that each specimen is separate from its neighbor, and place in cans with tight-fitting tops, filling in extra space with excelsior to prevent specimens from rubbing against one another. Pour in just enough fluid to keep packing material moist. The same care in this respect is as necessary when merely changing camp as during shipment to Museum.

Killing of reptiles may be done either by chloroform or by "pithing" with a needle or scalpel.

In trapping, do not let a line get stale. Keep all settings sensitive. Avoid using too much bait as well as too little. Re-bait faithfully the last thing at night, where ants are active during the day. Divide your efforts logically between the common and rare species. As a rule, even with the commonest species, save a pair of adults from each locality. Where available, series up to thirty from one locality should be saved, these to include young of different stages as well as adults.

With birds, do not use up time on series of well-known, and particularly migrant, species. However, save anything unrecognized or needed to back up notebook determination.

NOTE TAKING

Head each and every notebook page with collector's name and page number, locality (in detail the first time used), and date. Enter for each specimen all details of data pertaining to take -- collector's number (left of red line), name of species, sex, weight, measurements, color of iris and soft parts; also whether (if) skeleton, skull-only, or alcoholic. Use vernacular name of species, if you are not sure of scientific name.

Write full notes, even at risk of entering much information of apparently little value. One cannot anticipate the needs of the future, when notes and collections are worked up. The following are suggested topics, but do not restrict yourself to these alone. Be alert for new ideas and new facts.

Describe vegetation, nature of ground, slope exposure, and drainage of each belt of animal life collected in. Describe exact location of trap lines, referring to your topographic maps, and also enter a sketch, in profile, or surface view, or both, to illustrate the relations of the different associations crossed.

Keep record of closeness of settings of traps, distance covered, and results of each night's trapping; give number of traps put out in each association and number of animals of each species captured in each (whether or not preserved), with sex and age.

Keep full record of breeding data: Number and approximate size of embryos, or of young found in nests; state of incubation in eggs. Dig out burrows if practicable; make drawings to scale; describe fully.

Record food plants; keep specimens for identification where not known by name; preserve cheek pouch contents, contents of gullets, stomachs of mammals and large birds. If these are not saved, identify and record contents.

Note regularly in notebook all "pick-ups"; that is, odd skulls or fragments of animals of whatever sort or source, serially numbered along with specimens of the more usual sort. Give full information, as with odd skulls secured from trappers. Label all such specimens fully and carefully.

Obtain information from old residents of each locality as to former numbers and distribution of the large mammals and birds of the region. Record accurately the address of each person giving such information, and your opinion as to his reliability.

Note general attitude of men interviewed as to adequacy of game laws. Record data as to reported violations of game laws. Where game and fur-bearing species are disappearing, or even exterminated, ascertain local opinion as to causes therefor, and what might be done to favor return of original conditions.

Record economic relations of vertebrate animal life, that is, effect on agriculture, stock raising, etc., with full details.

Keep daily censuses, with locality preferences shown. These censuses, if short, need not be entered on formal census sheets. When leaving a well-worked locality, enter a summary of species observed, with remarks, if worth while.

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SUGGESTIONS AS TO LIFE HISTORY NOTES
(Birds, Mammals, Reptiles, Amphibians)

Gather all possible information on the following:

Markings and coloration (meanings apparent: directive, disruptive, protective, concealing).

Speed (gait, climbing, swimming, walking, running, flying); tracks.

Scatology (dung or feces).

Abundance.

Plant associates; habitat; environment (define ecologic niche in which each animal is found).

Range (home range of individual, topographic and geographic range of species, indications of change in range).

Call-notes or voice (interpretations whenever possible); songs of birds.

Migrations (regular, irregular, local, altitudinal, geographical); movements and flight.

Degree of gregariousness (including "social instincts"); manner or means of communication (as voice, gesture, touch, and smell-signals).

Pretended deceptions.

Nests and homes; breeding habits (including number of young, length of breeding period, mating, promiscuous, polygamous, monogamous, relations of individuals of family group to each other); modes of locating nests or homes; sanitation; solicitude; reactions of young; training of young; mastology (distribution of mammary glands).

Boldness; belligerence; shyness.

Food-habits; forage range; manipulation of food; regurgitation.

Acuteness of the various senses (touch, taste, sight, hearing, smell, and direction).

Amusements (example, otter slide).

Enemies; disease (parasites, internal and external).

Odd partnerships; commensalism.

Age (length of life).

Relations to man (harmful, beneficial); detailed data should be carefully and amply recorded).

One-fourth or less of the life-histories of mammals is known.

To learn the obscure points concerning animal life-histories will require:

- (a) the highest skill of which the individual is possessed;
- (b) a vast amount of persistence and perseverance, and
- (c) a tremendous capacity for hard work.

DATA ESPECIALLY DESIRED ON GAME AND FUR-BEARING ANIMALS

Record fully all evidence as to human interference with "natural balance".

Ascertain relations of tree squirrels and other mammals to forestry. Interview National Forest and National Park rangers wherever possible. Invariably note name of your informant, his position and his address.

Deer -- When antlers are shed. When antlers start growing again. When velvet wears off and antler becomes hard. Detailed information as to local migrations. Local names and varieties recognized. Status, present and past. Estimates of numbers on particular areas.

Bear -- Food. Damage done by. Sentiment of people regarding protection of. Status present and past. Estimates of numbers, present and past. Proportion of browns to blacks. Relations of browns to blacks.

Other game and fur-bearing mammals -- Life history (habit) notes of all sorts in detail. Suggested headings: migrations -- how extensive, what time of year; relations of males and females throughout the year; details of lairs, dens, nests; breeding habits -- nos. of young -- no. of litters per year -- how long in nest -- food of young -- care of young;

hibernation -- dates and degree of completeness; peculiar or unusual incidents; food; drink; relation to other species of animals or plants; length of individual's life; enemies; scatology; mastology; detailed study of tracks; sanitation; animal play; intelligence activity; temperament; parasitism; local names; effect of forest fires on status; effect of severe storms; effect of severe seasons; dates between which fur is prime; opinions as to whether species should be protected or destroyed; methods of capture.

Interview trappers as to habits, abundance, and status of fur-bearers and game mammals. Ascertain present abundance as compared with other species at present, and secure detailed opinion as to present as compared with former status. So far as possible get definite statements expressing percentage abundance now as compared with status a definite number of years back. Trapping methods in detail; data as to number of trappers.

Note general attitude of men interviewed as to game laws and conservation. Record data as to violations of game laws, with names and addresses of persons concerned. Note all criticisms of laws or officers whose duty is to enforce them.

Note -- Read above suggestions every few days, devoting a half hour or so to thoughtful consideration of the objects of our field work, which are: To ascertain everything possible in regard to the natural history of the vertebrate life of the regions traversed, and to make careful record of the facts gathered in the form of specimens and notes to be preserved for all time, for information of others.

J. Grinnell

May 9, 1929

